COMMONWEALTH MYCOLOGICAL INSTITUTE

C. A. B.
OCT 1953
FILE

REVIEW
OF
APPLIED MYCOLOGY

VOL. XXXII SEPTEMBER 1953

PONTIS VIDELA (R. E.). **Una podredumbre de la Caraota (Phaseolus vulgaris L.) en Venezuela, causada por Pythium aphanidermatum.** [Root rot of Bean (*Phaseolus vulgaris* L.) in Venezuela caused by *Pythium aphanidermatum*.]—*Agron. trop., Maracay*, 2, 3, pp. 207–209, 1 fig., 1952. [Received May, 1953.]

Pythium aphanidermatum was recorded on beans (*Phaseolus vulgaris*) [*R.A.M.*, 31, pp. 366, 416] in Venezuela for the first time in an experimental planting of different varieties at the National Institute of Agriculture, Maracay.

WINGRAVE (E. GWENDA). **Some diseases of Lettuce.**—*Tasm. J. Agric.*, 23, 4, pp. 302–307, 5 figs., 1952.

Five lettuce diseases common in Tasmania are briefly described with measures for their control. Included are downy mildew (*Bremia lactucae*) [*R.A.M.*, 24, pp. 135, 439], grey mould (*Botrytis cinerea*) [ibid., 31, p. 270], and lettuce mosaic virus [ibid., 30, p. 362].

BARNES (W. C.) & EPPS (W. M.). **Two types of anthracnose resistance in Cucumbers.**—*Plant Dis. Reptr*, 36, 12, pp. 479–480, 1952. [Multilithed.]

In greenhouse and field trials at Clemson College Truck Experiment Station, Charleston, South Carolina, only six of the hundreds of cucumber accessions obtained from the Division of Plant Exploration and Introduction showed sufficient degree of resistance to anthracnose (*Colletotrichum lagenarium*) [*R.A.M.*, 30, p. 505 and next abstract] to be used in a breeding programme. Of these P.I. 197,087 was immune and P.I. Nos. 175,111, 175,120, 179,676, 183,308, and 183,445 possessed a high degree of resistance. The immunity of P.I. 197,087 was only partially dominant and controlled by more than one gene, while in the other five accessions resistance was inherited as a single dominant factor.

WATANABE (T.) & TAMURA (M.). **Studies on the perfect stage of the causal fungus of the anthracnose of Cucumber.**—*Ann. phytopath. Soc. Japan*, 16, 3–4, pp. 137–140, 3 figs., 1952. [Japanese, with English summary. Received March, 1953.]

In March, 1949, the ascigerous state of the cucumber anthracnose fungus (*Colletotrichum lagenarium*) [*R.A.M.*, 32, p. 59 and preceding abstract] developed in a potato agar culture. The perithecia were of the *Glomerella* type, but as the fungus differed in important respects from previously described species of the genus it is designated *G. lagenaria* n. sp. [without a Latin diagnosis]. The perithecia are dark brown, spherical, subspherical, or pyriform, membranaceous, and immersed in a stroma, and measure 112 to 256 μ in diameter. The hyaline, sessile, clavate or cylindrical asci measure 47·5 to 77·5 by 7·5 to 11·25 μ, and the hyaline, oblong, straight or slightly curved, elliptical or fusoid, unicellular ascospores 12·5 to 27·5 by 3·75 to 6·25 μ. The rate of ascospore production was delayed at 25° to 30° C.

compared with 20° to 15° [? 15° to 20°] and was most copious and rapid on potato decoction with or without agar.

JAIN (A. C.). **Control of Pythium fruit-rot of Cucurbits in Madhya Pradesh.**—*Nagpur agric. Coll. Mag.*, 26, 1–4, pp. 4–5, 1952.

Luffa aegyptica and *Lagenaria vulgaris* suffered severe damage by *Pythium aphanidermatum* [*R.A.M.*, 23, p. 359] in Madhya Pradesh, India, in 1949. The percentages of healthy fruit after treatment with 2–2–50 Bordeaux mixture once a week at the rate of 1 gal. per plant, either alone or plus 10 oz. linseed oil per 50 gals. of the mixture, or staking so that the fruits did not touch the ground, were 71·05, 94·1, and 97, respectively, as against 51·6 for the [untreated] control.

UOZUMI (T.) & YOSHII (H.). **Some observations on the mildew fungus affecting the cucurbitaceous plants.**—*Ann. phytopath. Soc. Japan*, 16, 3–4, pp. 123–126, 3 figs., 1952. [Japanese, with English summary. Received March, 1953.]

Sphaerotheca fuliginea appears to be the only pathogen causing mildew of cucurbits in Fukuoka, Japan, at present [*R.A.M.*, 18, p. 84]. Perithecia often occur in this region in late autumn but very rarely in other parts of the country. *Erysiphe cichoracearum* [ibid., 32, p. 215] from tobacco and *Artemisia vulgaris*, *Oidium* from sesame, and *S. fuliginea* from *Bidens bipinnata* were not pathogenic to cucumber but *S. fuliginea* from *Arctium lappa* was. *S. fuliginea* from cucumber was pathogenic to *A. lappa* and *Phaseolus radiatus* but not to eggplant, *Chrysanthemum coronarium*, *Helianthus tuberosus*, sunflower, or tobacco. Leaves 16 to 23 days old at inoculation were the most susceptible to infection and those up to three days old the most resistant.

JOTANI (Y.). **On the Fusarium wilt of Stachys sieboldii Miq.**—*J. Jap. Bot.*, 28, 1, pp. 26–28, 1 fig., 1953. [Japanese, with English summary.]

Wilt of *Stachys sieboldii* was observed in the Tsumura Medicinal Botanic Garden in spring, 1951. In inoculation tests the causal organism, which appeared to be a strain of *Fusarium oxysporum*, was pathogenic to seedlings of *S. sieboldii* but not to watermelon, cucumber, or *Luffa cylindrica*.

RAMSEY (G. B.) & HEIBERG (BARBARA C.). **Cladosporium rot of Peppers.**—*Plant Dis. Reptr*, 36, 12, pp. 481–482, 1 fig., 1952. [Multilithed.]

Cladosporium herbarum was found to be responsible for the decay of California bell type [chilli] peppers [*R.A.M.*, 18, p. 354] in some shipments received at the Chicago market. In 1952, 90 to 100 per cent. in 195 crates stored on arrival for five days at 40° F. developed severe infection, some with over 50 spots 1 to 8 mm. in diameter. Storage below 40° retards the development of *C. herbarum* on the fruits but does not check it completely. Field and packing-house treatments and careful selection at loading time are essential for the control of the disease.

VARMA (P. M.). **Studies on the relationship of the Bhendi yellow vein-mosaic virus and its vector, the white fly (Bemisia tabaci Gen.).**—*Indian J. agric. Sci.*, 22, 1, pp. 75–91, 1 pl., 1952. [Received May, 1953.]

In studies at the Department of Plant Pathology, College of Agriculture, Poona, India, it was established that at least 10 white flies (*Bemisia tabaci*) were required to produce 100 per cent. infection of bhendi (*Hibiscus esculentus*) with yellow vein mosaic virus [*R.A.M.*, 31, p. 6]. A preliminary four-hour fasting period or less and a feed of one hour on diseased plants secured the virus and improved the efficiency of the flies as vectors, females being only slightly better than males. A 30-minute feed on healthy plants was adequate for transmission. Post-acquisition fasting for

up to four hours was also effective and flies could still transmit the disease after feeding for 15 minutes only. Flies fed on diseased plants for 12 to 24 hours remained infective for life. They could acquire the virus from the youngest leaf a few days before disease symptoms appeared. The minimum incubation period of the virus in the fly was seven hours, but very few insects were infective at the end of this period.

HUMFELD (H.) & SUGIHARA (T. F.). **The nutrient requirements of Agaricus campestris grown in submerged culture.**—*Mycologia*, 44, 5, pp. 605–620, 13 graphs, 1952.

In work at the Western Regional Research Laboratory, Albany, California, the nutrient requirements for the growth of mushroom mycelium in shake flasks were determined in a 5 per cent. glucose medium with urea as a nitrogen source. For maximum flavour and good yield of mycelium the requirements were (in mgm. per l.): nitrogen 1,500 to 2,000; phosphorus 300 to 400; potassium 100 to 300; sulphur 200, magnesium 20, iron 2, zinc 2. The corresponding figures for maximum mycelial yield only were 1,000, 50, 100, 50, 20, 0·1 and 0·4.

RASMUSSEN (C. R.). **Mushroom growing in Denmark.**—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), 4, 2, pp. 24–27, 4 figs., 1952.

This is a brief review of the mushroom-growing industry in Denmark. A short section is devoted to mushroom diseases, bacterial spot [unspecified: cf. *R.A.M.*, 31, p. 531] being one of the most troublesome.

Truffle.—*Mushroom News* (W. Darlington & Sons, Ltd., Worthing, Sussex), 4, 2, pp. 28–29, 1 fig., 1952.

Control measures for mushroom truffle disease (*Pseudobalsamia microspora*) [*R.A.M.*, 32, p. 299] are briefly discussed. An examination of the records of the various mushroom troubles sent to the Service Laboratory, W. Darlington & Sons, Ltd., Worthing, Sussex, in the 1952 season revealed a disturbing increase in the disease, hitherto of little importance.

ALEXANDER (T. M. W.). **Using peat as a casing medium.**—*Comm. Gr.*, *1953*, 2998, pp. 1243–1244, 4 figs., 1953.

The use of peat, particularly the dark sedge type, as a casing medium [cf. *R.A.M.*, 32, p. 229] in mushroom cultivation is strongly recommended. It produces a satisfactory crop with a low disease incidence, is easy to handle, and costs about the same as casing soil, 1 cwt. covering 60 to 90 sq. ft. of bed. It should be well moistened and never allowed to dry out before use.

BARRETT (H. C.). **Black rot resistance in Grapes.**—*Diss. Abstr.*, 13, 1, p. 2, 1953.

Resistance to black rot in grapes [*Guignardia bidwellii*: *R.A.M.*, 25, pp. 330, 332] was studied at the University of Illinois in 1950 and 1951. Inoculations were successful when inoculum was derived from natural sources, but not when agar cultures were used. Ten wild vine species were placed in the following order of decreasing resistance rated on a scale of 0 to 4 according to the number and size of black rot lesions and the pycnidia within them: *V*[*itis*] *cinerea*; *V. rupestris*; *V. champini* and *V. rubra*; *V. bicolor*; *V. cordifolia*; *V. doaniana*, *V. longii*, and *V. riparia*; *V. amurensis*.

Fifty-four clone parents showed similar reactions whether inoculated with *G. bidwellii* or exposed to natural infection. Nearly 2,000 F_1 progenies derived from 78 different crosses between these parents were inoculated in the greenhouse. In general the F_1 was intermediate in resistance but there was considerable variation.

Precise studies on the genetics of inheritance of black rot resistance in grapes must be carried to further generations and will necessitate a stricter control of environmental conditions.

MAGNANI (G.), CICCARONE (A.), & SIBILIA (C.). **Seconda relazione su prove di lotta antiperonosporica con prodotti organici.** [Second report on tests of the control of *Peronospora* with organic materials.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 8 (*1950*), pp. 245–248, 1952. [English summary.]

In further tests of organic materials for the control of vine mildew [*Plasmopara viticola*: *R.A.M.*, 32, p. 361] in 1951 vines near Rome were given (1) six applications of 1 per cent. Bordeaux mixture; (2) four of 4 per cent. parzate with two (fourth and sixth) of Bordeaux; and (3) five of parzate and one (the sixth) of Bordeaux. The vines were sprayed on 12th and 23rd May, 5th and 19th June, 10th July, and 2nd August. Weather conditions favoured infection, the first outbreak being on 20th May. A more serious attack occurred about 3rd to 4th June, the foliage of untreated vines being almost completely destroyed; in the treated plots over 15 per cent. of the bunches and about 30 per cent. of the leaves were affected. After 5th June the weather changed and the outbreak was arrested. On 13th October the yields for the three treatments were, respectively, 2·21, 2·99, and 2·88 kg. per vine, the figures for the percentage sugars being 20·42, 20·82, and 20·92, respectively. In August there was little difference between the treatments in respect of defoliation but on 10th November those treated with parzate averaged 55 per cent. defoliation as against 45 per cent. for Bordeaux. There was greater development of vascular tissue following parzate treatments and of the medullary rays after Bordeaux. The results given by parzate are considered encouraging.

REYNEKE (J.) & PIAGET (J. E. H.). **The use of bisulphites in the control of wastage in fresh Grapes.**—*Fmg in S. Afr.*, 27, 319, pp. 477–479, 1 graph, 1952.

In the gas treatment of grapes against mould wastage, dry stalk, and general deterioration during storage and transportation [*R.A.M.*, 19, p. 286] the berries are required to absorb approximately 15 p.p.m. sulphur dioxide; higher or lower concentrations are injurious or ineffective. In laboratory tests at the Western Province Fruit Research Station, South Africa, the desired concentration was obtained by spraying the woodwool of a packed box (10 to 20 lb.) with 20 ml. of a 40 per cent. chemically pure sodium bisulphite solution [ibid., 22, p. 194]. In order to adjust the variable protection given by this treatment in commercial practice and to determine the rate at which the various bisulphite products in solution will liberate sulphur dioxide and the factors controlling liberation, further tests were carried out.

Pure sodium bisulphite liberated the gas at over twice the rate of the corresponding commercial product, while crystalline sodium metabisulphite liberated it at almost four times the rate from the powder form and over seven times that from the commercial sodium bisulphite solution generally used in practice.

The gas from bisulphite solutions is most volatile at pH levels up to 4·7 and moderately so from pH 4·7 to 5·4. At pH 5, therefore, sulphur dioxide should be liberated at a rate convenient for practical purposes. A rate equal to that of the liberation from 40 per cent. commercial sodium bisulphite is obtained by adding approximately 5 per cent. sodium carbonate to a 40 per cent. solution of sodium metabisulphite crystals or approximately 4 per cent. sodium carbonate to the powder form.

Aeration of a 40 per cent. solution of sodium metabisulphite powder caused a rise in pH to 5 after 2½ hours and the gas was liberated at almost the same rate as all the other 40 per cent. solutions having the same pH. After 22 hours' aeration

the pH rose to 5·4 and gas was liberated very slowly. Therefore, the storage or transportation of bisulphites in open or poorly sealed containers will cause a loss of gas and a rise in pH, necessitating the testing of the product before use and adjustment of the pH.

Further work along these lines is recommended.

FREITAG (J. H.), FRAZIER (N. W.), & FLOCK (R. A.). **Six new leafhopper vectors of Pierce's disease virus.**—*Phytopathology*, 42, 10, pp. 533–534, 1952.

At the College of Agriculture, University of California, Berkeley and Riverside, six additional leafhopper vectors of Pierce's disease [lucerne dwarf] virus, bringing the total to 20, were demonstrated by transmission of the virus from infected vine and lucerne plants to previously healthy ones of the same species [*R.A.M.*, 31, p. 168]. They were *Draeculacephala californica*, *D. noveboracensis*, *D. crassicornis*, *Cuerna yuccae*, *Graphocephala cythura*, and *Homalodisca liturata*, all members of the Tettigellinae. None is considered to be of any importance in the dissemination of the virus to its economic hosts, though they may be concerned in its spread to wild plants.

BUCHANAN (R. E.). **Conference on virus and rickettsial classification and nomenclature.**—*Int. Bull. bact. Nomencl. Tax.*, 2, 2, pp. 71–78, 1952.

At the International Conference on Virus and Rickettsial Classification and Nomenclature [cf. *R.A.M.*, 22, p. 446] held in New York on 11th and 12th January, 1952, opinions were divided. The numbering and binomial (Linnaean) systems, priority, starting points, and types were all discussed. The chief problems were concerned with differentiation and classification rather than nomenclature.

BAWDEN (F. C.) & KLECZKOWSKI (A.). **The behaviour of some plant viruses after exposure to ultraviolet radiation.**—*J. gen. Microbiol.*, 8, 1, pp. 145–156, 1953.

At Rothamsted Experimental Station, Harpenden, Herts., preparations of tobacco mosaic virus inactivated by ultraviolet rays interfered slightly with infection by active tomato bushy stunt virus on *Nicotiana glutinosa* and Rothamsted tobacco necrosis virus on bean (*Phaseolus vulgaris*) var. Prince and considerably more so with infection by active tobacco mosaic virus on *N. glutinosa* [*R.A.M.*, 31, p. 169]. Similarly, inactivated tobacco necrosis virus interfered slightly with infection by tobacco mosaic virus and more so with the action of active tobacco necrosis. In contrast, inactivated bushy stunt virus did not affect the numbers of lesions produced by active virus preparations.

The residual infectivity of irradiated preparations of tobacco necrosis and tomato bushy stunt was greater when inoculated plants were exposed to light than when they were kept in the dark. Irradiated preparations of tobacco mosaic had the same residual infectivity irrespective of whether inoculated plants were placed in the light or in darkness.

Although all three viruses have particles of different shapes and sizes the course of ultraviolet inactivation in each closely resembled that of a first-order reaction.

HIRATA (S.). **On the turbidity of pressed-out juices from some virus-infected plants.**—*Ann. phytopath. Soc. Japan*, 17, 1, pp. 21–24, 2 graphs, 1952. [Japanese, with English summary. Received March, 1953.]

The turbidity of expressed sap from virus infected potato and sweet potato tubers and the storage roots of radish and turnip was measured by means of an electric photometer. During storage the turbidity of healthy potato sap was generally slightly lower than that of the diseased, depending on disease severity and duration of storage. The average turbidity of sap from many healthy potato tubers was

generally higher than that of diseased. The greatest difference between healthy and diseased sap occurred at a dilution of 1 in 8. With radish and turnip the difference between healthy and diseased was more marked. The upper part of the root showed higher turbidity than the lower. There was only a slight difference between healthy and diseased sweet potato sap. The turbidity degree of sap from living materials was inversely related to the protein content, but this was not so with sap from old or diseased plants. It is evident that the turbidity test cannot be applied to quantitative analysis although it might be utilized for diagnostic purposes.

LIMASSET (P.). **Quelques nouveautés sur les méthodes d'extraction de certains virus.** [Some innovations in methods of extracting certain viruses.]—*Atti Soc. ital. Pat.*, 2, 2, pp. 911–917, 1951. [Received 1952.]

In work on virus extraction methods at Versailles [*R.A.M.*, 32, p. 116] with tobacco mosaic in tobacco leaves the amount of virus in serological units was determined after mechanical maceration, grinding, and after the action of snail enzymes [ibid., 30, p. 126]. It was found that the effect of the enzymes declined as the fineness of the grinding increased. If as little water as possible is used with mechanical extraction the liquid obtained, though diluted, contains more virus than is obtained when a mortar is used, and to obtain the same quantity of virus only one-quarter the weight of leaves is required. At present the mechanical method is used successfully at Versailles for all virus extraction [cf. ibid., 32, p. 218].

The extraction of dahlia mosaic virus [ibid., 30, p. 231; 31, p. 121] from affected leaves of plants grown outdoors is described. The solvents were 10 per cent. nicotine sulphate plus 5 per cent. sodium bisulphite and a trace of potassium cyanide. The final solution gave a distinct absorption of 2,600 to 2,700 Å, as against almost nil for equivalent extracts from healthy plants. Ten young dahlia plants grown from seed when inoculated by rubbing with the purified juice all developed characteristic symptoms four weeks later.

For young glasshouse plants in winter extraction was made with 0·1 per cent. potassium cyanide solution, which stabilized the virus.

New or uncommon plant diseases in England and Wales.—*Plant Path.*, 1, 3, pp. 101–102, 1952.

H. H. GLASSCOCK reports that lucerne at Wye, Kent, in 1950 developed wilting and breaking-off at the stem base, where black lesions were present. Affected plants were scattered throughout the plots but were most abundant in two circular patches corresponding to slight depressions in the ground. By 12th August these plants were almost defoliated, but after the crop was cut subsequent growth remained healthy. Acervuli of a *Colletotrichum* sp. with spores measuring 15 by 5 μ were present on most lesions. The fungus, the first record of *C.* sp. on lucerne in England, is tentatively referred to *C. trifolii* [cf. *R.A.M.*, 30, pp. 232, 490, 598].

W. A. R. DILLON WESTON, R. E. TAYLOR, and F. JOAN MOORE state that galls on tomato roots in a glasshouse at March, Isle of Ely, in October, 1950, contained spore balls resembling those of *Spongospora subterranea* [ibid., 29, p. 178]. Seed potatoes were regularly chitted in the same house. Similar symptoms were also observed on tomatoes at Ardleigh, Essex, in 1950. In neither case was any adverse effect noted on the plants during the growing season.

R. E. TAYLOR notes that a stem-end rot of tomatoes associated with an abundant development of *Trichothecium roseum* [cf. ibid., 30, p. 634] caused severe fruit-drop in a poorly ventilated cold glasshouse at Baldock, Herts., in October, 1951. Leaf mould (*Cladosporium fulvum*) had been severe, and had attacked the calyces on the fruits. *T. roseum* was isolated and found to be pathogenic to wounded ripe fruits.

A. G. ROBERTSON observed circular, dark brown, papery lesions 5 to 10 mm. in

diameter and surrounded by a yellow halo on leaves of polyanthus [*Primula polyantha*] at Bristol in October, 1951. In culture pycnidia were produced with spores 3 to 6 by 1 to 3 μ similar to those of *Phyllosticta primulicola*.

In October, 1951, I. W. PRENTICE received leaves of *Hoya carnosa* from Hounslow, Middlesex, with chlorotic, concentric ring patterns, which proved to be infected with tomato spotted wilt virus. This constitutes a new host record.

SIBILIA (C.). **Rassegna dei casi fitopatologici più notevoli osservati nel 1950.** [Review of the most outstanding records of phytopathological interest observed in 1950.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 215–240, 1953.

The principal crop diseases observed in Italy in 1950 are dealt with in this report [cf. *R.A.M.*, 32, p. 423].

I. Department of Plant Pathology of Agricultural Research Centre. II. The most important diseases of crop plants in Finland.—*Maatalousk. kasvitautiosast. Tiedon.* 5, 10 pp., 1951. [Mimeographed.]

Most of the information in this report on the past and present activities of the Finnish Department of Plant Pathology, Tikkurila, near Helsinki, has already been noticed from other sources. *Cercosporella herpotrichoides* [C.M.I. map No. 74] is a prevalent agent of foot rot of spring cereals, especially wheat. Potato pathogens include *Alternaria solani* [ibid., No. 89], *Verticillium albo-atrum*, *Actinomyces* [*scabies*], and *Fusarium caeruleum*. Streak [unspecified virus], crinkle [X+A viruses], and mild mosaic [virus X] are also encountered in potato crops, but they are of relatively little importance in Finland [*R.A.M.*, 29, p. 636].

Among other organisms causing damage to vegetables may be mentioned *Cladosporium cucumerinum* on cucumber, *Peronospora destructor* [C.M.I. map No. 76] and *Allium* virus 1 [onion yellow dwarf: ibid., No. 46] on onion, and *Colletotrichum lindemuthianum* [ibid., No. 177] on bean [*Phaseolus vulgaris*].

Raspberries are subject to infection by *Didymella applanata* [ibid., No. 72] and strawberries by *Mycosphaerella fragariae* [ibid., No. 110].

Details are given of the numbers of plant-protectives for different crops investigated by the Department in 1950. In 1951 the Finnish Parliament passed an act to regulate the trade in plant-protectives.

Outbreaks and new records.—*F.A.O. Plant Prot. Bull.*, 1, 3, pp. 43–44, 1952.

I. L. CONNERS reports that in 1952 wheat stem rust [*Puccinia graminis*: *R.A.M.*, 32, p. 62] was first found in the Canadian Prairies on 30th June, south of Winnipeg. At harvest heavy infection was largely confined to the Red River Valley and the region to the north between Lake Manitoba and Lake Winnipeg. Moderate infection was present across the rest of southern Manitoba and reached south-eastern Saskatchewan; farther north and west only an occasional field of late wheat was affected. In areas of heavy infection the average loss to common wheat was estimated at 2 to 3 per cent., but the damage to western Canada's wheat crop as a whole was well under 1 per cent. In the Red River Valley some fields of durum wheat appeared to be a total loss, and about half the durum crop sustained losses of 25 to 50 per cent. in yield and 4 to 5 lb. in bushel weight. Severe damage to durum occurred also in late fields elsewhere in southern Manitoba and south-eastern Saskatchewan. Leaf rust [*P. triticina*: loc. cit.] caused a loss estimated at 5 per cent. The one resistant common wheat is Lee [ibid., 32, p. 369]. Dwarf bunt (*Tilletia brevifaciens*) [see next abstract] caused very light infection of Cornell 595 winter wheat on two farms in York County, Ontario. It appears that the seed was contaminated when imported from New York State about 1946. Dwarf bunt also occurs in a small winter wheat area in the interior of British Columbia; it is unknown elsewhere in Canada.

J. L. Allison reports that one field of local Turkish tobacco in the Surdash area of Sulimaniya province in northern Iraq suffered considerable damage by black shank (*Phytophthora parasitica* var. *nicotianae*) [cf. ibid., 32, p. 216]. This is believed to be the first record of this disease in the Near East.

R. W. Jugenheimer observed rough dwarf of maize [ibid., 32, p. 249] during the summer of 1952 in the canton of Ticino, southern Switzerland, and in northern Italy. Heavy damage was caused occasionally.

Miller (P. R.). **Plant disease situation in the United States.**—*F.A.O. Plant Prot. Bull.*, 1, 3, pp. 36–37, 1952.

During 1952, the Rex and Elmar wheat varieties, hitherto highly resistant to dwarf bunt (*Tilletia brevifaciens*) [*R.A.M.*, 32, pp. 307, 426, and preceding abstract], developed heavy infection in Idaho, strongly indicating the presence of a new pathogenic race attacking varieties with the Martin factor for resistance. The presumably new race also differs from the older one in that it causes less dwarfing and less stimulation of tillering. The occurrence of dwarf bunt on certain forage grasses in Union County, Oregon, is further evidence that more than one pathogenic race of the fungus is present in the Pacific Northwest. Several rye plants affected by dwarf bunt were found in a Utah wheat field, apparently the first record of the disease on this host. Effects ranged from complete infection with characteristic dwarfing and increased tillering to one or two infected spikes of about half the normal height.

California Wonder bell [chilli] peppers growing in Georgia were seriously attacked by *Cladosporium capsici* [ibid., 19, p. 192], apparently the first record of this fungus in the United States.

Rao (V. P.). **Progress in plant protection in India.**—*F.A.O. Plant Prot. Bull.*, 1, 1, pp. 11–16, 1952.

Reviewing the work done by the Central Directorate of Plant Protection, Quarantine, and Storage, New Delhi, India, since its establishment in 1946, the author states that the numerous plant disease surveys made demonstrated that wheat yellowing rot (*Corynebacterium tritici*) [*R.A.M.*, 14, p. 571; 31, p. 9] and leaf spot (*Septoria tritici*) [ibid., 20, p. 234], hitherto regarded as minor diseases, are now of some importance. Wheat flag smut (*Urocystis tritici*) [ibid., 27, p. 315; 28, p. 387], previously restricted to Punjab and Delhi, was found in Rajasthan.

Brief details are given of campaigns conducted against a number of diseases, 157,850 acres of rice being grown in 1951–52 from treated seed [see next abstract]. Treatment was also organized against seed-borne diseases of wheat and barley, and roguing of diseased sugar-canes and planting of disease-free setts were undertaken to eliminate red rot (*Physalospora tucumanensis*) [ibid., 31, p. 298]. Potato early blight (*Alternaria solani*) [ibid., 32, p. 146] and late blight (*Phytophthora infestans*) [loc. cit.] occurred chiefly in Assam and West Bengal.

Plant protection work in Hyderabad State during 1951–52.—*Plant Prot. Bull., New Delhi*, 4, 2, pp. 32–33, 1952.

In accordance with the plant protection service organized by the Department of Agriculture, Hyderabad State, India, about 1,164,448 acres of jowar [sorghum] seed were treated with 16·6 tons of sulphur against grain smut [*Sphacelotheca sorghi*: *R.A.M.*, 32, p. 177], resulting in an increased yield of 823,336 maunds [1 maund = 82·284 lb.]. Enough rice seed to cover some 1,000 acres was treated with agrosan GN [loc. cit. and preceding abstract] against seed-borne diseases, and about 100 acres were sprayed with perenox (0·35 per cent.) or 1 per cent. Bordeaux mixture for the control of rice blast [*Piricularia oryzae*: loc. cit.]. Over 4,000 mango trees were treated against powdery mildew [*Oidium mangiferae*: ibid., 29,

p. 250] and 70 grape vines against anthracnose [*Elsinoe ampelina*: C.M.I. map No. 234] and powdery mildew [*Uncinula necator*: *R.A.M.*, 11, p. 622]. About 1,000 citrus trees were sprayed with a zinc sulphate and lime mixture against 'frenching' disease [? zinc deficiency: ibid., 32, p. 177] and some 4,650 received treatment against die-back [ibid., 24, p. 502], gummosis [*Phytophthora* spp.: ibid., 31, p. 183], chlorosis, and canker [*Xanthomonas citri*: ibid., 32, p. 183].

Van der Plank (J. E.). **Research in plant pathology in Africa.**—African Regional Scientific Conference, Johannesburg, October 17 to October 28, 1949. II. Statements and Communications, pp. 145–148, 1949–50. [French summary. Received 1953.]

The author summarizes briefly the plant-pathological research activities in South Africa. The two main centres under the control of the Department of Agriculture are at Pretoria, serving the summer rainfall area, and Stellenbosch, serving the winter rainfall area. Smaller Government institutions exist in different parts of the country, and certain industries employ pathologists independently. The current research activities include the control of virus diseases of fruit and vineyard stock [cf. *R.A.M.*, 29, p. 76], attention being directed to the production of virus-free stocks. This may involve the maintenance under glass of tested trees of proven strains of the standard commercial varieties.

The author then makes suggestions for a co-ordinated policy in plant pathology in Africa, which is still free from many serious plant diseases found elsewhere and the aim must be to keep it so by the provision of a few strategically sited quarantine stations. The most pressing need of plant pathology in Africa to-day is for adequate numbers of qualified plant pathologists.

Allison (J. L.). **Diseases of economic plants in Iraq.**—*F.A.O. Plant Prot. Bull.*, 1, 1, pp. 9–11, 1952.

Preliminary surveys of plant diseases in the vicinity of Baghdad and in the northern part of Iraq [cf. next abstract and above, p. 472] showed that bunt (*Tilletia foetida* and *T. caries*, mostly the former) was present in almost all the wheat fields visited, though infection was invariably light. Copper carbonate, the only seed disinfectant used locally, was applied to some extent in seed treatment against this disease, especially in Mosul province. Locally, wheat is attacked by powdery mildew (*Erysiphe graminis*), stem rust (*Puccinia graminis*), leaf rust (*P. rubigo-vera*) [*P. triticina*], stripe rust (*P. glumarum*) [C.M.I. map No. 97], leaf spot (*Leptosphaeria tritici*), loose smut (*Ustilago tritici*), flag smut (*Urocystis tritici*), and leaf blotch (*Septoria tritici*), barley by the first four of these and by leaf rust (*P. hordei*), giant millet [*Sorghum vulgare*] by covered kernel smut (*Sphacelotheca sorghi*) [ibid., No. 220], loose kernel smut (*S. cruenta*), and long smut (*Tolyposporium ehrenbergii*), and rice by blast (*Piricularia oryzae*) [ibid., No. 51]. Cotton is affected by boll and lint rots due to *Rhizopus* sp., *Aspergillus* sp., and *Nematospora coryli* [ibid., No. 163], which are usually severe and follow boll injuries by the spiny boll-worm *Earias insulana*. Tobacco powdery mildew (*Erysiphe cichoracearum*) is prevalent, in some seasons affecting leaf quality.

Common vegetable diseases include lettuce downy mildew (*Bremia lactucae*) [ibid., No. 86], onion downy mildew (*Peronospora destructor*) [ibid., No. 76], powdery mildew (*Erysiphe cichoracearum*) of cucurbits and okra [*Hibiscus esculentus*], tomato powdery mildew (*Oidiopsis* [*Leveillula*] *taurica*) [ibid., No. 217], beet leaf spot (*Cercospora beticola*) [ibid., No. 96], and wilt (*Fusarium* spp.) of cucurbits and tomato.

The only disease of economic importance found on the 30,000,000 date palms grown along the banks of the Tigris and the Euphrates and their tributaries is inflorescence rot (*Mauginiella scaettae*) [cf. *R.A.M.*, 17, p. 507; 30, p. 585], and this

occurs only when winter is prolonged and accompanied by low temperatures and abundant moisture. No destructive outbreak has occurred in the past few years. The only important disease of citrus is brown rot (*Phytophthora citrophthora*) [C.M.I. map No. 35]; it induces decline and death of trees in some groves. A damaging wilt of the pistachio tree was present in most orchards near Mosul; *Rosellinia necatrix* was present on the roots of dead and dying trees.

Among the more common diseases of fruits and nuts are apple scab (*Venturia inaequalis*) [ibid., No. 120], grape powdery mildew (*Uncinula necator*), peach leaf curl (*Taphrina deformans*) [ibid., No. 192], rust (*Puccinia pruni-spinosae*) [ibid., No. 223] of peach, plum, and apricot, shot hole (*Cylindrosporium padi*) [cf. *R.A.M.*, 32, p. 261] of plum, peach, and apricot, and leaf blister (*Polystigmina* [*Polystigma*] *rubrum*) [C.M.I. map No. 148] of plum and almond.

Lucerne is cultivated in date orchards and irrigated fields round Baghdad and other cities to the south. It is cut throughout the year and marketed while green. It is occasionally affected by *E. polygoni*, *Pseudopeziza medicaginis* [ibid., No. 129], and *Uromyces striatus*, but little damage results.

Bermuda grass [*Cynodon dactylon*], found in Iraq wherever there is enough water for plant growth, is considered an excellent lawn grass and is also widely used as forage. It is affected by tar spot (*Phyllachora cynodontis*), head smut (*Ustilago cynodontis*), and rust (*Puccinia cynodontis*), but not much damage is caused.

Al-Adhami (A.). **A preliminary list of plant diseases in Iraq.**—*Tech. Bull. Minist. Agric. Iraq* 17, 14 pp., 1953. [Mimeographed.]

This list of the plant diseases observed, mostly by the author, in Iraq [see preceding abstract] during the past ten years, is arranged in alphabetical order under the scientific names of the hosts, the common English and Arabic designations of pathogens and plants also being given.

Kovoor (A.). **Action du jus de Raisin sur la croissance des tissus de crown-gall de Scorsonère cultivés 'in vitro'.** [Action of Grape juice on the growth of *Scorzonera* crown gall tissues cultured *in vitro*.]—*C.R. Acad. Sci., Paris*, 236, 3, pp. 309–311, 1 graph, 1953.

A strong impetus was lent to the proliferation of *Scorzonera* tissues infected with crown gall [*Bacterium tumefaciens*] cultured *in vitro* [*R.A.M.*, 31, p. 596 and next abstract] by the addition to the medium of filtered white grape juice at the optimum concentration of 5 per cent.

Kulescha (Zoïa). **Action de l'hydrazide maléique sur la prolifération des tissus de crown-gall de Scorsonère et sur leur teneur en auxine.** [Action of maleic hydrazide on the proliferation of *Scorzonera* crown gall tissues and on their auxin content.]—*C.R. Acad. Sci., Paris*, 236, 9, pp. 958–959, 1953.

When fragments of crown gall [*Bacterium tumefaciens*] tissues from *Scorzonera* [see preceding abstract] were cultured on a nutrient medium, the addition of maleic hydrazide [*R.A.M.*, 32, p. 237 and next abstract] inhibited their growth, which began to decline with a concentration of 10^{-7} and ceased entirely at 10. The auxin content of the tissues did not appear to be influenced by the treatment.

Manil (P.) & Straszewska (Z[ofia]). **Action de l'hydrazide maléique sur les tumeurs du crown-gall.** [The action of maleic hydrazide on crown gall tumours.]—*Bull. Inst. agron. Gembloux*, 20, 1–2, pp. 128–131, 1 pl., 1952.

Experiments are described demonstrating that maleic hydrazide [see preceding abstract] at 50 to 800 mg. per l., applied by spraying or in plasticine fixed close to the stems, arrested or retarded the development of crown gall (*Agro*[*bacterium* = *Bacterium*] *tumefaciens*) on *Datura stramonium* plants [see next abstract].

Straszewska (Z[ofia]) & Manil (P.). **Action, sur le 'crown-gall', du filtrat de culture de Agrobacterium tumefaciens et d'une suspension bactérienne pure stérilisée à 48° C.** [The action on crown gall of the culture filtrate of *Agrobacterium tumefaciens* and of a pure bacterial suspension sterilized at 48° C.]—*Bull. Inst. agron. Gembloux*, 20, 1–2, pp. 132–136, 1 pl., 1952.

When a culture filtrate of *Agrobacterium* [*Bacterium*] *tumefaciens* [see following abstracts] in plasticine was applied to cut stems of four *Datura stramonium* plants [see preceding abstract] subsequently inoculated with the bacterium, only nine of 20 inoculations gave rise to galls, which remained smaller than those on the untreated controls. When the filtrate was applied after gall formation, the galls dried up, leaving withered scars. When the roots of inoculated *D. stramonium* plants were steeped in the filtrate, ten inoculations gave only three small tumours, which developed one month later than the larger galls on the untreated plants. Treatment with a pure suspension of the bacterium killed by exposure to a temperature of 48° C. had no effect on crown gall unless applied directly to the galls, when slight superficial necrosis developed.

Braun (A. C.). **The crown-gall disease.**—*Ann. N.Y. Acad. Sci.*, 54, 6, pp. 1153–1161, 3 figs., 1 diag., 1952.

Studies on crown gall (*Agrobacterium* [*Bacterium*] *tumefaciens*) [see preceding and next abstracts] at the Rockefeller Institute for Medical Research, New York [*R.A.M.*, 32, p. 238], indicated that somatic mutation is not likely to prove to be the explanation of the nature of the cellular alteration involved. They suggested that the substance which causes the development of tumour cells becomes diluted in and is eventually lost from crown-gall tumour cells that are forced to grow and divide with great rapidity.

Levine (M.). **A heat chamber for the study of the crown gall disease under controlled temperature and humidity.**—*Bull. Torrey bot. Cl.*, 80, 3, pp. 217–224, 1 fig., 1 diag., 1953.

A chamber provided with an automatic, electrically controlled heating device, vaporizing water, and feeding water for humidification was devised at Montefiore Hospital, New York, for testing the effect of high temperatures and high relative humidity on plant overgrowths.

Preliminary trials with this apparatus indicated that the determining factors in freeing incipient crown galls (*Agrobacterium* [*Bacterium*] *tumefaciens*) [see preceding and next abstracts] on mature periwinkle plants (*Vinca rosea*) [cf. *R.A.M.*, 30, p. 406] from the incitant bacteria appeared to be the constant application of high temperature and high relative humidity. However, exposure to a temperature of 46·5° C. and a relative humidity of 80 to 85 per cent. for 24 hours killed the growing points and many apical leaves.

Roberts (R. H.). **A naturally occurring antiauxin.**—*Science*, 117, 3043, pp. 456–457, 4 figs., 1 graph, 1953.

In studies in the Department of Horticulture, University of Wisconsin, Madison, when crystals of a plant extract were placed in a longitudinal slit made in the fourth internode from the base of potted Bonny Best tomato plants, and the plants were then inoculated with *Agrobacterium* [*Bacterium*] *tumefaciens* [see preceding and next abstracts] strain A6, early growth of the galls was slower than in untreated, inoculated plants, and leaf epinasty, adventitious rooting, and cambial activity were greatly inhibited. Terminal growth was almost normal.

Czosnowski (J.). **Charakterystyka fizjologiczna trzech typów tkanek Vitis vinifera : normalnej, tumora bakteryjnego (crown gall) i tumora chemicznego, hodowanych in vitro.** [Physiological features of three types of tissue of *Vitis*

vinifera: normal, crown-gall and chemical tumours, cultivated *in vitro*.]—*Pozn. Towarzys. Przyjacioł Nauk* [*Pozn. Soc. Friends Sci.*], 13, 4, 20 pp., 2 graphs, 1952. [Received June, 1953.]

Chemical and biochemical analyses at the Department of Medicine, Poznań Society of Friends of Science, Poland, of three types of vine tissue obtained from Dr. Morel in Paris [*R.A.M.*, 30, p. 144], i.e., normal, crown gall (*Phytomonas* [*Bacterium*] *tumefaciens*) [ibid., 31, p. 543 and preceding abstracts], and tumours habituated to heteroauxin showed that the crown gall tissue occupied an intermediate position between the other two. The chemical tumours were distinguished by a maximum activity of almost all the enzymes examined and had the lowest respiratory activity, while crown gall had the highest. These differences in the intensity of respiration suggest another type of metabolism in the chemical tumours which obviously lack complete physiological harmony as, for instance, in the isodiametric growth and the separation of the cells. Crown gall tissue is more 'balanced'.

Kraght (A. J.) & Starr (M. P.). **Pectic enzymes of Erwinia carotovora.**—*Arch. Biochem., N.Y.*, 42, 2, pp. 271–277, 1 graph, 1953.

Grown in a semi-synthetic medium containing 10 gm. pectin, a culture of *Erwinia carotovora*, isolated from a commercial shipment of rotted Mexican bell [chilli] peppers in 1949 in the market at Los Angeles, California, liberated 94 per cent. of the potential methanol content. This phenomenon is considered to afford positive evidence of pectinesterase activity. The production or secretion of polygalacturonase by the bacterium into the medium is greatly increased by the addition of pectin [*R.A.M.*, 31, p. 8].

Siller (L.). **The efficacy of fungicides against Phytophthora palmivora Butl.**—*Cacao* (*Int.-Amer. Cacao Cent.*), 2, 34–36, p. 2, 1952.

In this short summary of a paper under the same title published as *Commun. Turrialba* 17, it is reported that none of the newer fungicides tested for the control of *Phytophthora palmivora* on cacao [*R.A.M.*, 32, pp. 70, 425] in 1949–50 at the Inter-American Cacao Experiment Farm, La Lola, Costa Rica, was better than Bordeaux mixture either in the prevention of infection or in adhesiveness under the environmental conditions of the experiment. The percentage of diseased plants 26 to 29 days after treatment with Bordeaux mixture (1 per cent. in two experiments and 1·2 per cent. in all the others) was 36·4 and for crag 531, crag 658, and bioquin 1 (all at 0·5 per cent.) 44·8, 57, and 54·8, respectively, as against 99·5 for the untreated. The adhesiveness of some of these fungicides should be increased.

Hirai (T.), Koshimizu (Y.), & Koiwa (T.). **Chemical nature of the intercellular inclusions in Wheat plants caused by Triticum virus 1A.**—*Virus* (*Japan*), 2, pp. 257–262, 1 pl., 1952. [Japanese, with English summary.]

The X-bodies in the epidermal cells of wheat leaves infected by *Triticum* virus 1A [a strain of wheat mosaic virus] in Japan [C.M.I. map No. 84] were readily distinguishable from the nuclei by their reaction to trypan blue, erythrosin-trypan blue, erythrosin-methylene blue, pyronin-methyl green, Giemsa, and Sudan III. The presence of ribonucleic acid in the X-bodies was indicated by staining with trypan blue, Giemsa, and pyronin-methyl green after removal of the nucleic acid by pre-treatment with trichloracetic, perchloric, or hydrochloric acid. All tests for protein were positive. Crystal inclusions of different sizes, also apparently containing protein, were detected in the cytoplasm and within the vacuole of the X-bodies.

Willis (S. J.). **Ergot in Wheat variety trials in Hertfordshire.**—*Plant Path.*, 2, 1, pp. 34–35, 1953.

In 1952, during a variety and manurial trial of winter wheat at Buntingford, Herts., evidence was obtained of differences in varietal susceptibility to ergot (*Claviceps purpurea*) [*R.A.M.*, 32, p. 422], the mean number of ergots per sample (three samples) for Cappelle, Vilmorin, Holdfast (two only), Atle, Little Joss, and Hybrid 46 being, respectively, 128, 66, 64, 18, 15, and 12. Very small numbers of ergots were also present in wheat at other trials in Hertfordshire in 1952, chiefly in the varieties found most susceptible at Buntingford.

Minabe (M.). **On the relation between the disease-susceptibility of naked Barley and the silicification of epidermal cells of leaves.**—*Proc. Crop Sci. Soc. Japan*, 19, 3–4, pp. 255–258, 4 figs., 1951. [Japanese, with English summary. Received June, 1953.]

Studies were made in Japan on the relation between the susceptibility of naked barley to rust (*Puccinia simplex*) [*P. hordei*: *R.A.M.*, 30, p. 620] and powdery mildew (*Erysiphe graminis hordei*) [ibid., 32, p. 308] and leaf silicification. The incidence of uredosori and mildew spots was reduced in water culture to which silicic acid had been added. The acid appeared to inhibit mechanical invasion. Inhibition also took place when plants given silicic acid were inoculated immediately after the leaves had been treated with a narcotic. Powdery mildew infection was decreased by a reduced period of sunlight [see next abstract], although the same condition gave rise to imperfect silicification and a thin cuticle.

Minabe (M.). **On the influence of the sun light shortening to the infection of diseases and the yield of naked Barley.**—*Proc. Crop Sci. Soc. Japan*, 19, 3–4, pp. 342–344, 1951. [Japanese, with English summary. Received June, 1953.]

The reduced infection by barley powdery mildew (*Erysiphe graminis*) in relation to a shortened period of sunlight in Japan [see preceding abstract; cf. *R.A.M.*, 26, p. 296] is attributed to the consequent lack of nutrient substances in the host.

New Barley, Cordova, for Texas plains.—*Seed World*, 72, 10, p. 31, 1953.

Cordova, a new winter barley variety, was resistant to all known races of mildew [*Erysiphe graminis*: see preceding abstracts] in several years of tests in Texas.

Diseases of the Oat crop.—*Adv. Leafl. Dep. Agric. Scot.*, N.S., 21, 9 pp., 2 pl., 1952.

Brief, popular notes are given on seed-borne diseases of oats controllable by seed disinfection, those not so controlled, soil-borne and other fungal diseases, and non-parasitic disorders. A key for the identification of oat diseases in the field in Britain is provided.

Sharp (E. L.) & Smith (F. G.). **The influence of pH and zinc on vesicle formation in Puccinia coronata avenae Corda.**—*Phytopathology*, 42, 11, pp. 581–582, 1 fig., 1 graph, 1952.

In studies at the Iowa State College up to 40 per cent. formation of substomatal vesicles by *Puccinia coronata* was obtained on 3 per cent. gelatin at appropriate pH and zinc concentrations. The appressoria, of variable shape and smooth outline, were frequently provided with finger-like projections [*R.A.M.*, 7, p. 156]. At a pH of 6·2 to 6·6 vesicle formation began at 6 p.p.m. zinc, reached a peak between 9 and 14 p.p.m., and was not observed at or above 18 p.p.m. Zinc concentrations exceeding 14 p.p.m. caused a shortening of the germ-tubes, which became pronounced at 18 and 23 p.p.m. No vesicles developed at pH 5·9 and 7·1. The formation of short secondary branches near the uredospore also occurred over pH

and zinc ranges corresponding very closely to those for vesicle formation. A few atypical vesicles developed at the optimum pH on 0·5 per cent. water agar with the addition of 11 and 23 p.p.m. zinc. Attempts to induce vesicle formation by the incorporation of other metallic elements in the medium were unsuccessful, and it is concluded, therefore, that zinc exerts a specific effect on the germ-tubes comparable to that resulting from contact with the guard cells of the host.

Hingorani (M. K.). **Factors affecting the survival ability of certain physiologic races of Puccinia graminis avenae Erikss. & Henn.**—*Phytopathology*, 42, 10, pp. 526–531, 1 graph, 1952.

Continuing his studies at the Minnesota Agricultural Experiment Station on physiologic specialization in stem rust of oats (*Puccinia graminis avenae*) [*R.A.M.*, 32, p. 371], the author found that race 8 was more virulent than 2 and 7, the numbers of varieties susceptible to each, out of 59 tested, being 50, 32, and 38, respectively. Moreover, the uredospores of race 8 germinated more profusely and rapidly than those of the other two, and it is probably the least sensitive to a reduction of light intensity. Race 7 produced teleutosori rapidly at all the temperatures between 2° and 30° C., whereas races 2 and 8 formed them only at 2°. The teleutospores of race 7, unlike those of 2 and 8, did not require the normal six-month resting period. Race 7 was found to be relatively homogeneous in respect of factors for pathogenicity on the three differential varieties used in the experiments, viz., Jostrain, Minrus, and Richland, though it comprised several biotypes varying in their effects on the last-named.

Bobrov (Ruth A.). **The effect of smog on the anatomy of Oat leaves.**—*Phytopathology*, 42, 10, pp. 558–563, 3 figs., 1952.

Serious damage is caused to the oat crop in the Los Angeles district of California by 'smog' (in which more than 50 chemical elements and compounds have been detected) [*R.A.M.*, 30, p. 207]. The nature of the injury is determined by the normal anatomical pattern of the parallel-veined leaf, the stomata as a channel of entry for the noxious elements in the air, and the amount of internal air space in the leaf. The initial effects may be observed under the microscope as the cells directly lining the substomatal chambers shrink. The progressive involvement of more cells is accompanied by longitudinal streaking of the leaves, corresponding to the position of the stomatal zones, sometimes culminating in the browning and necrosis of the entire blade.

Oort (A. J. P.). **Van moederkorenvergiftiging tot moederkorencultuur.** [From ergotism to ergot cultivation.]—*Meded. Dir. Tuinb.*, 15, 8, pp. 743–757, 10 figs., 1 graph, 1 map, 1952. [English summary.]

The virtual disappearance of ergot (*Claviceps purpurea*) as a natural disease of rye and the continued demand for the drug led the author in 1951 to resume experiments interrupted by the war on its artificial cultivation in Holland by the methods of Von Békésy, Hecht, and Stoll [*R.A.M.*, 25, p. 65].

Greenhouse-grown plants, which headed about a month before the field crops, were inoculated as the ears emerged and the resultant honeydew collected. A sufficient quantity was produced from 1 sq. m. of greenhouse plants for the inoculation of 0·1 to 0·2 ha. of crop. Two appliances were used for inoculation, one a rotating cylinder fitted with needles [loc. cit.] and the other a rectangular block with needles on one face, operating on the principle of a sewing-machine. The rye was sown in rows spaced 25 cm. apart and inoculated 7 to 10 days before flowering; the sclerotia were harvested (with a 7- to 10-day interval) over a period beginning about 20 days before the ripening of the crop. Tetraploid rye produced

larger sclerotia than diploid [ibid., 32, p. 181], thereby reducing picking costs, the total yields being the same. The harvested sclerotia must be rapidly and thoroughly dried to prevent loss of alkaloid through oxidation. The alkaloid content of the Dutch product was 0·17 per cent. In normal seasons a yield of 150 to 200 kg. per ha. may be expected. The value of ergot on the London market from 1948 to 1951, inclusive, is shown by means of a graph, and it is concluded that at a price of 50 dutch florins per kg. cultivation would be profitable. The enterprise is in the hands of the Dutch Co-operative Herbgrowers' Association.

McKeen (W. E.). **Preliminary studies of root and basal stalk rot of maturing Corn in Ontario.**—*Canad. J. Bot.*, 31, 1, pp. 132–141, 4 pl., 1 graph, 1953.

This is a detailed account of studies in Ontario on basal stalk rot of maize, some of which has been noticed from other sources [*R.A.M.*, 30, p. 564; 31, p. 430]. Surveys in 1949 and 1950 showed that the disease was present in every maize field in Ontario and is of major importance in reducing yields. Also present is bacterial stalk rot (*Erwinia dissolvens*) [ibid., 30, p. 307], but it is of no economic significance. *Diplodia zeae* and *Gibberella zeae* are virtually non-existent in the area. Common basal stalk rot usually originates from diseased maize roots [cf. ibid., 32, p. 249], but may arise in tunnels produced by borers [*Pyrausta nubilalis*]. Bacteria, *Pythium arrhenomanes* [ibid., 32, p. 372], and *Fusarium moniliforme* [*G. fujikuroi*: ibid., 31, p. 52] were commonly found in the necrotic part of the stalk, *P. arrhenomanes* first attacking the root, where it caused necrosis. Diseased plants begin to appear in mid-August and become more numerous daily until the first killing frost occurs or the plants become senescent. Some of the roots are decayed, the medullary tissues are destroyed, and the stalk frequently breaks over near ground level. All the pathogens finally produce the same syndrome.

Niccolini (P.) & Mannucci (E.). **Contributo allo studio farmacologico della Ustilagine del Granturco—VI. Indagini sulla presenza e conservabilità della lattoflavina.** [A contribution to the pharmacological study of the *Ustilago* on Maize. VI. Researches on the presence and keeping qualities of lactoflavin.]—*Arch. ital. Sci. farmacol.*, Ser. III, 1, 3, 14 pp., 2 figs., 2 diags., 1951. [English and German summaries. Received 1952.]

In studies at the Pharmacological Institute, Siena, it was found that the spores of *Ustilago zeae-maydis* [*U. maydis*: *R.A.M.*, 32, p. 427] contain about ½ mg. of lactoflavin [vitamin B_2] per 100 gm. of the dry drug [cf. ibid., 22, p. 301]. The vitamin persists well in the drug, but after extraction loses weight rapidly.

[An account of this work also appears in *Boll. Soc. ital. Biol. sper.*, 26, 6, 2 pp., 1950.]

Erickson (L. C.). **Lemon storage. Pre-storage treatment reduces black buttons, decay, delays fruit aging.**—*Calif. Agric.*, 6, 12, p. 4, 1 fig., 1952.

Pre-storage treatment of lemons with the growth regulators 2,4-D [*R.A.M.*, 30, p. 239] and 2,4,5-T [loc. cit.] is stated to improve their keeping quality in store, to reduce black buttons and [unspecified] decay, and delay fruit ageing.

Oxenham (B. L.) & Sturgess (O. W.). **Citrus virus diseases in Queensland.**—*Qd agric. J.*, 76, 2, pp. 68–75, 10 figs., 1953.

Short popular notes are given on the symptoms and mode of transmission of citrus virus diseases in Queensland, with general recommendations for their control.

Bazán de Segura (Consuelo). **La 'tristeza' de los Cítricos en el Peru.** ['Tristeza' on Citrus in Peru.]—*Inf. Cent. Invest. agríc., Lima*, 77, 14 pp., 4 figs., 1952. [Multilithed.]

This account of the history, economic importance, etiology, transmissibility, and control of the 'tristeza' root rot of citrus [*R.A.M.*, 32, pp. 184, 429], was prompted by its recent discovery in Peru.

Bitters (W. P.) & Parker (E. R.). **Quick decline studies. Rootstock investigations test various top-root combinations in search of tolerant Citrus varieties.**—*Calif. Agric.*, 6, 4, pp. 10–11, 16, 6 figs., 1952.

Descriptions and results are given of the experiments carried out at the University of California College of Agriculture, Riverside, to determine the tolerance of certain top-root citrus combinations to quick decline [*R.A.M.*, 32, p. 428].

Nadel-Schiffman (Mina). **Une contribution à la pathogénie du Penicillium digitatum et du Penicillium italicum sur les fruits des Agrumes.** [A contribution to the pathogenesis of *Penicillium digitatum* and *Penicillium italicum* on Citrus fruits.]—*Fruits Prim. Afr. N.*, 22, 238, pp. 309–310, 1952.

In French North Africa the degree of infection of citrus fruits by *Penicillium digitatum* and *P. italicum* [*R.A.M.*, 32, p. 430 and next abstract] in any season is influenced by various factors, including soil quality, air temperature, climatic conditions, and maturation. The two fungi react differently to these factors [ibid., 31, p. 603].

La lutte contre le Penicillium des Agrumes. [The control of the Citrus *Penicillium*.] —*Fruits Prim. Afr. N.*, 22, 241, p. 460, 1952. [Received February, 1953.]

Details are given of the properties of a new fungicide, 'deciquam', which is reported to have proved of value in the control of *Penicillium* diseases of citrus [*P. digitatum* and *P. italicum*: see preceding abstract] in French North Africa.

Chowdhury (S.). **Further observations on foam disease of Citrus.**—*Sci. & Cult.*, 18, 9, pp. 434–435, 1953.

In further studies on citrus foam disease [*R.A.M.*, 29, p. 301] at the Plant Pathology Laboratory, Jorhat, Assam, the disease was not reproduced when Khasi orange trees (*Citrus reticulata*) were inoculated with pure cultures of the organisms isolated from the lesions, or when wounded or unwounded portions of the stem were treated with the exuded foam. Washing the trunks to a height of 6 to 7 ft. with a fungicide or an insecticide did not help to check the disease, nor did budding on to stocks of other kinds of citrus. These results indicate that the disease is physiological in nature, the exuding foam being the result of yeast fermentation.

Martyn (E. B.). **Diseases of Coconuts in Trinidad and Tobago.**—*J. agric. Soc. Trin. Tob.*, 52, 2, pp. 145–147, 149, 1952.

In this brief review of the coco-nut situation in Trinidad and Tobago a number of the more important diseases [cf. *R.A.M.*, 31, p. 383] are listed with annotations.

Castaño (J. J.). **Algunas observaciones sobre la 'llaga negra' radicular del Cafeto.** [Some observations on black root rot of the Coffee bush.]—*Bol. inf. Colombia*, 4, 37, pp. 28–30; 38, pp. 30–34, 2 figs., 1953. [Mimeoprinted.]

The author reviews the literature concerning the identification of the agent of black root rot of coffee in South and Central America, attributed primarily to species of *Rosellinia* [*R.A.M.*, 31, p. 383], though *Fusarium bulbigenum* var. *coffeae* [ibid., 27, p. 472] has been associated with the disease in Colombia. The

conditions favouring the disease were studied at the National Centre for Coffee Research, Chinchina. It affects particularly plantings one to five years old on newly cleared, highly acid land, rich in organic material and where rotting timber still remains; it is aggravated by excessive humidity.

The following preventive measures are recommended. Coffee seedlings should be planted on new land only after preliminary crops, such as maize or beans [*Phaseolus vulgaris*]. The soil should be free from plant debris and any manure used should be thoroughly decomposed. The site of each plant should be raised above the level of surrounding soil to prevent waterlogging. Undergrowth should be kept down and damage to the roots avoided.

Curative measures consisted in carefully exposing the main root of wilting bushes and rubbing this and sprinkling the displaced soil with sulphur. Fresh soil, free from organic matter, was mixed with wood ash and lime and heaped on top of the original soil. After six months bushes with only incipient symptoms at the time of treatment were cured but those suffering from yellowing and defoliation were not improved. Further experiments on these lines are envisaged.

Castaño (J. J.). **Patogenia y epifitología en el estudio de la llaga macana del Cafeto.** [Pathogenicity and epiphytology in the study of 'sabre wound' of Coffee trees.]—*Bol. inf. Colombia*, 4, 39, pp. 17–24, 2 diags., 1 graph, 1953. [Mimeoprinted.]

Details are given of the pathogenicity, stages of development in the host, survival in the soil, duration of infection, dissemination (by means of raindrops, plant debris, tools, and man), and factors affecting *Ceratostomella* [*Ceratocystis fimbriata*], the agent of 'sabre wound' of coffee bushes in Colombia [*R.A.M.*, 30, p. 366; 31, p. 551].

Kalyanasundaram (R.) & Lakshminarayanan (K.). **Rooting of cut shoots of Cotton in culture filtrate of Fusarium vasinfectum.**—*Nature, Lond.*, 171, 4364, p. 1120, 1953.

At the University Botany Laboratory, Madras, a study was made of the toxicity of culture filtrates of the cotton wilt pathogen, *Fusarium vasinfectum*, grown in synthetic Czapek's medium, to cut shoots of cotton. The culture filtrate, after dialysis to remove metabolites, induced typical wilt symptoms in the shoots [*R.A.M.*, 32, p. 430]. Higher dilutions of the neat filtrate and any concentration after autoclaving (15 lb. for 15 min.) induced profuse rooting, but no wilting.

Evlahova (Mme A. A.). Применение микробиологического метода в борьбе с вредной черепашкой. [The application of a microbiological method for the control of the shield bug pest.]—Докл. Акад. сельскохоз. Наук Ленина [*Rep. Lenin Acad. agric. Sci.* = *Proc. Lenin Acad. agric. Sci.*], 18, 3, pp. 36–39, 1 fig., 1 diag., 1953.

At the Pan-Soviet Scientific Research Institute for Plant Protection, U.S.S.R., successful and promising control of young and adult spring and summer shield bugs [Pentatomidae] in wheat fields was obtained by infecting them with *Aspergillus repens* [*R.A.M.*, 27, p. 489], which entered the bug either by the mouth or the spiracles. The fungus preparation, which was applied either by dusting pounded maize containing spores of the fungus or by spraying a water suspension of fresh hay overgrown with it over wheat rows and on the foot of the plants, is harmless to the plant [cf. ibid., 14, p. 91] and remains viable on the substrate under field conditions for $1\frac{1}{2}$ to 2 months.

Reinking (O. A.). **Third progress report on the Abaca mosaic disease control campaign.**—39 pp., 2 charts, 1951. [Mimeographed. Received 1952.]

This report is intended to bring up to date the progress of work on the control

of abaca mosaic [? a strain of cucumber mosaic] virus on abaca [*Musa textilis*] in the Philippines [*R.A.M.*, 30, p. 39; 31, p. 119] and to suggest means of expediting the campaign, especially in the few remaining critical areas such as Kidapawan and Davao City.

Steady progress in control eliminated the risk of the Mindanao abaca industry being ruined. Fibre yield in 1951 was 483,464 bales, an increase of 112,950 over that for 1950. Of the 84,238 ha. planted with abaca in Mindanao and Sulu approximately 62,800 were affected by mosaic. By the end of February, 1952, approximately 72 per cent. of the area had been rogued once so that it became a source of clean material for all extensive new plantings in the adjoining virgin areas. Before control can be accomplished in the Kidapawan district the maize plantings in 14 per cent. of the farms must be eliminated. Approximately 2,780 ha. in the provinces of Bukidnon and Lanao are affected by mosaic.

By the end of June, 1952, with a supplemented and more efficient labour force the majority of the affected regions should have been treated at least once. After a second treatment the disease is expected to be practically under control. Rapid control has been made possible by using 2,4-D [ibid., 29, p. 153] to kill diseased plants. A healthy sucker can then be planted safely alongside throughout the plantation. The cost of the campaign to the end of June, 1952, is estimated at 994,033 pesos.

In an accompanying pamphlet entitled 'How to control abaca mosaic' (3 pp.) by J. A. Agati and B. S. Castillo, the authors recommend the application of an insecticide to all diseased hills and suckers, making a single or double V-cut on every stalk above ground level; spraying or painting the stumps and the surrounding soil thoroughly with a herbicide and covering them with abaca leaves weighted down with the cut stalks to prevent the rain from washing off the solution. In undulating land a shallow canal should be dug around the treated hill to prevent the solution from flowing to neighbouring hills. Treated plantations should be inspected regularly for signs of new outbreaks. It is important to use separate sprayers for the insecticide and herbicide.

Ocfemia (G. O.). **The control of Abacá mosaic.**—*Bi-w. Bull. Coll. Agric. Univ. Philippines*, 14, 15, 2 pp., 1950. [Mimeographed. Received 1952.]

This information on the control of abaca mosaic [? a strain of cucumber mosaic virus] on abaca [*Musa textilis*] in the Philippines has already been noticed from other sources [*R.A.M.*, 29, p. 153; 31, p. 119 and preceding abstract].

Geddes (Cleone H.). **Resistance of Roses to Diplocarpon rosae—the cause of blackspot.**—*Amer. Rose Annu., 1952*, pp. 188–197, 1952.

In this review the author lists varieties and species of roses resistant to black spot (*Diplocarpon rosae*), use of which should lessen the necessity of spraying or dusting [*R.A.M.*, 30, p. 610]. Varieties found to be highly resistant in [unpublished] work at Cornell University are Little Compton Creeper, Coral Creeper, Pink Princess, Dr. W. Van Fleet, Apricot Glow, and Erskine. The most resistant varieties listed by various workers were found to have a common parentage in *Rosa wichuriana* which is regarded as the source of resistance. The nature of the resistance is discussed, but there is no conclusive evidence as to its exact nature, features possibly contributing including a waxy bloom on the leaves preventing the adherence of water, mechanical features of the host tissue, and physiological reactions such as the absence of necessary nutrients for the fungus.

Mulcock (A. P.). **Carnation leaf-rot. New disease recorded in New Zealand.**—*N.Z. Gdnr*, 9, 9, p. 607, 1953.

Heteropatella valtellinensis was observed on carnations [*R.A.M.*, 29, p. 603] for

the first time in New Zealand in 1951 and has since become of economic significance. The disease is best checked by improved cultural methods and the avoidance of stagnant conditions. Bordeaux mixture and copper oxychloride sprays are reported to give some protection.

Prentice (I. W.). **Chrysanthemum flower distortion survey, 1951.**—*Plant Path.*, 1, 3, pp. 77–80, 1 pl. (between pp. 84–85), 1952.

Summarizing the available information on distortion and colour breaking of chrysanthemum flowers not definitely associated with leaf symptoms, the author proposes that the term 'chrysanthemum flower distortion' should be used instead of 'mosaic' previously employed [*R.A.M.*, 30, p. 231] to describe the disease. Colour breaking is sometimes so severe that the whole bloom appears as if bleached; the corolla may be rolled, tubular along most of its length, or twisted, or the central florets may remain small and greenish. The inflorescence is usually small and commercially worthless. It has been demonstrated by inoculation that chrysanthemums with distorted flowers are infected with tomato aspermy virus [cf. ibid., 31, p. 384], though proof of pathogenicity has not yet been reported.

Circumstantial evidence suggests that environmental and cultural conditions may affect severity. Mild cases of the disease are difficult to recognize [ibid., 31, p. 284]; many, probably all, varieties are susceptible. A limited survey in 1951 indicated that the disease is widespread in England and Wales. Some stocks have a high percentage of infection, due, primarily, to the propagation of infected material, but the average over the country is low, and the evidence suggests that spread from plant to plant is not generally rapid. The possibilities of control are discussed.

Beaumont (A.). **Cyclamen diseases.**—*Gdnrs' Chron.*, Ser. 3, 133, 3468, p. 240, 1953.

In this brief account of the diseases known to affect cyclamen, the following are reported as having been recorded in Britain: *Bacterium carotovorum* [*Erwinia carotovora*] present in several places, *Fusarium oxysporum* [cf. *R.A.M.*, 14, p. 585] recorded once in Cheshire, *Thielaviopsis basicola* [ibid., 16, pp. 319, 465], and *Cercosporella* sp. Stunted or dwarfed cyclamen plants which do not flower and often have reduced leaf blades with only a tapering leaf stalk have occasionally been reported. This disorder is not associated with any fungus or any other disease organism.

Ivanov (S. M.). Причины, вызывающие непаразитарную корневую гниль Герани. [Factors responsible for non-parasitic root rot of Geranium.] — Докл. Акад. сельскохоз. Наук Ленина [*Rep. Lenin Acad. agric. Sci.* = *Proc. Lenin Acad. agric. Sci.*], 18, 5, pp. 33–37, 1953.

The reduced growth of *Pelargonium roseum* in the Grusian S.S.R. and its ultimate death, resulting from a typical root rot, was found to be due to the breakdown of the normal acid-restoring processes. This disorder, which is favoured by inadequate soil aeration, is characterized by a distinct increase in the content of ascorbic acid [vitamin C] and other reducing substances and the breakdown of carbohydrate conversion. Preventive measures include improvement in the physical properties of the soil and increase in its fertility.

Limber (D. P.). **Sori of Gladiolus smut in the white flesh of Gladiolus corms.**—*Phytopathology*, 42, 10, p. 578, 1 fig., 1952.

Further consignments of *Gladiolus* corms with smut (*Urocystis gladiolicola*) [*R.A.M.*, 28, p. 291; 31, p. 119] lesions in the white tissue have been received at the Bureau of Entomology and Plant Quarantine inspection house at Hoboken, New Jersey. The small lesions are covered by unbroken epidermis and appear

superficially as bluish-black spots. Larger lesions nearly always originate in the basal plate and extend upwards through the core into the surrounding tissue, ultimately involving the entire corm. The dense, black spore ball masses and scanty mycelium of *U. gladiolicola* are quite distinct from the spore balls of *Papulospora* spp. [ibid., 29, p. 307], which are borne on loose mats of brown mycelium.

FABRICATORE (JOLANDA A.). **Alterazioni su foglie di Trachelospermum (Rhynchospermum) jasminoides Lem.** [Lesions on leaves of *Trachelospermum* (*Rhynchospermum*) *jasminoides* Lem.]. **Ascochyta trachelospermi n. sp. e considerazioni relative ad una possibile revisione del genere Peyronellaea.** [*Ascochyta trachelospermi* n.sp. and considerations on a possible revision of the genus *Peyronellaea*.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 13–16, 69–82, 1 pl., 12 figs., 1953. [English summaries.]

This information concerning *Ascochyta trachelospermi* n. sp. on leaves of *Trachelospermum jasminoides* in Rome has already been noticed from another source [*R.A.M.*, 31, p. 492].

SREERAMULU (T.). **A new host—Tagetus patula—for Leveillula taurica (Lév.) Arn. (Oidiopsis taurica (Lév.) Salm.).**—*Sci. & Cult.*, 18, 11, pp. 540–541, 1953.

Powdery mildew (*Leveillula taurica*) [C.M.I. map No. 217] was observed on many plants of *Tagetes patula* in the Botanical Garden, Andhra University, Waltair, [Madras], in August, 1952.

COX (R. S.). **Control of Pyracantha scab.**—*Plant Dis. Reptr*, 37, 1, pp. 7–10, 1953. [Multilithed.]

From 1950 to 1952, inclusive, field trials were carried out at the Department of Plant Pathology, Delaware Agricultural Experiment Station, Newark, for the control of scab (*Fusicladium pirinum* var. *pyracantha*) on *Pyracantha coccinea* [var.] *lalandi* [*R.A.M.*, 26, p. 158]. Of the nine fungicides (new and standard) tested, three to four early applications of puratized agricultural spray (1 pt. in 100 gals. water) and Bordeaux mixture (4–4–100 or 8–8–100) gave the best control. The latter caused no serious injury to the plant in 1952 but it might do so and the former, on account of its eradicative property, might be used as a pre-blossom spray to avoid fruit injury.

FULKERSON (R. S.). **A preliminary study on the effect of some fungicides on the establishment of forage seedlings.**—*Canad. J. agric. Sci.* [formerly *Sci. Agric.*], 33, 1, pp. 84–90, 1953.

From 1949 to 1952 greenhouse trials were carried out at Guelph College, Ontario, to study the effect of fungicides on the establishment of common forage grasses and legumes [cf. *R.A.M.*, 32, p. 318] in Ontario, where failures to obtain satisfactory stands are quite common in some areas. In 1951 the hay crop alone covered some 4,000,000 acres and the need, therefore, for obtaining more desirable stands is very great. Seeds of eight grasses and five legumes were treated with several fungicides ($\frac{1}{2}$ per cent. by weight) and grown in different soil types. Post-emergence damping-off was prevalent on all soils and was more severe on legume than on grass seedlings. Leytosan P gave good protection to most grasses and legumes and was excellent for red clover and lucerne when applied in excess. Spraying the soil with vancide 51 (liquid) appeared promising in establishing legumes, especially if combined with seed treatment.

Gregory (K. F.), Allen (O. N.), Riker (A. J.), & Peterson (W. H.). **Antibiotics and antagonistic microorganisms as control agents against damping-off of Alfalfa.**—*Phytopathology*, 42, 11, pp. 613–622, 3 figs., 5 graphs, 1952.

This is a tabulated survey and discussion of the results of greenhouse experiments at the University of Wisconsin to determine the relative efficiency of actidione, fradicin, and cultures of *Penicillium patulum* (clavacin), *Trichoderma lignorum* [*T. viride*] (gliotoxin), two strains of *Streptomyces* sp., and *Bacillus* sp. in the control of damping-off of Kansas and Dakota lucerne seedlings caused by *Pythium* spp. [*R.A.M.*, 31, p. 449 and next abstract]. Of the five species tested, *P. ultimum* and *P. debaryanum* were more pathogenic than *P. graminicola*, *P. irregulare*, or *P. vexans*. Resistance to the disease increased with the age of the seedlings, little or no infection resulting from inoculation 14 to 20 days after sowing. Thus, the suppression of the pathogens for the first two to three weeks of growth was a primary objective.

Actidione at concentrations of 6·2 to 25 μgm. per ml. in the soil solution completely controlled damping-off but caused severe stunting, while fradicin at 34 μgm. per ml. was both phytotoxic and ineffectual in the prevention of infection. On the other hand, the inoculation of *T. viride* [ibid., 32, p. 277] and *Streptomyces* A 67 into sterile soil containing 1 per cent. glucose and infested with *P. debaryanum* entirely prevented damping-off. Added to the seed as part of a pellet, *T. viride* also protected the seedlings in sterilized soil inoculated with the same fungus, but *Streptomyces* A 67 failed to do so when applied in the same manner. Mass inoculation of the four antagonists into infested natural soil produced variable results, ranging from complete to temporary partial suppression, the process of control having apparently been assisted by the high temperatures (frequently exceeding 100° F.) which prevailed in July, 1949.

Gerhold (N. R.) & Henderson (W. J.). **Relief from Alfalfa killers in sight.**—*Colo. Fm & Home Res.*, 2, 6, pp. 4–5, 1952. [Abs. in *Biol. Abstr.*, 27, 2, pp. 459–460, 1953.]

When nine chemical seed treatments and one fungicidal soil treatment were tested in Colorado for the control of damping-off of lucerne seedlings caused by *Pythium debaryanum* [cf. *R.A.M.*, 30, p. 273 and preceding abstract], arasan, phygon XL, and arasan-nitragin seed treatments appeared to delay germination of 35 per cent. of the seed until after June. Dithane Z-78 and dow 9 B seed treatments and arasan soil treatment appeared to delay germination of 13 to 22 per cent. of the seed, though only 1 to 10 per cent. of that treated with agrox, nitragin-spergon, or nitragin alone, or the untreated seed was delayed. Stands were significantly increased by dithane Z-78 (seed) and arasan (seed or soil). Significant reductions in stand followed seed treatments with nitragin and nitragin-spergon. Spergon seed treatment did not differ significantly from the control.

Hanson (C. H.) & Allison (J. L.). **Studies on the nature and occurrence of stand depletion in Alfalfa strains in North Carolina.**—*Agron. J.*, 43, 8, pp. 375–379, 1 fig., 2 graphs, 1951.

Periodical determinations from 1946 to 1949 on 244 experimental strains of lucerne in North Carolina showed that stand depletion, mostly associated with *Fusarium* sp. and *Rhizoctonia* [*Corticium*] *solani* [see next abstract], reached a climax during the summer and early autumn, with lower losses during the late autumn and winter. Variations among the strains in percentage reduction of stand were highly significant, and were attributed largely to differential susceptibility to the two above-mentioned fungi, especially the former. Although none of the strains under observation was rated highly resistant, their variability opens up a prospect

of considerable improvement in resistance through selection and breeding. Other pathogens of minor importance were *Colletotrichum trifolii* and *Sclerotium rolfsii*.

Hawn (E. J.) & Cormack (M. W.). **Crown bud rot of Alfalfa.**—*Phytopathology*, 42, 9, pp. 510–511, 1952.

'Crown bud rot' is the name proposed for a hitherto undescribed disease complex causing progressive deterioration of lucerne stands in the irrigated areas of southern Alberta, Canada, after the first season of growth [cf. preceding abstract]. Brown lesions originating on the buds and young shoots at and below ground-level develop into a rot which kills the infected organs and may ultimately extend into the crown tissues. With the progress of infection through the field the crowns lose a portion of the buds and stems, with a consequent reduction in yield. An inspection of the five main lucerne-growing areas of the region revealed a high incidence of infection in all irrigated fields of a year old and upwards, the averages in the second and third seasons of growth being 50 to 75 and nearly 100 per cent., respectively. The disease rating of individual plants likewise increased with age, some 50 per cent. of the crown buds being destroyed in three- to four-year-old stands. In non-irrigated fields the rot was much less prevalent.

During a two-year period of investigation the fungi isolated from diseased material were *Fusarium acuminatum* (42 per cent.) [cf. *R.A.M.*, 31, p. 597], *F. avenaceum* (9), *F. culmorum* and *F. poae* (2 each) [cf. ibid., 17, p. 250], *Rhizoctonia* [*Corticium*] *solani* (28), *Ascochyta imperfecta* (10) [ibid., 25, p. 118; 31, p. 52], and *Plenodomus meliloti* [ibid., 27, p. 527], *Colletotrichum* sp., and *Alternaria* sp. (7). Of the foregoing, *F. acuminatum*, *F. avenaceum*, and *Corticium solani* were consistently associated with the crown bud rot in all the irrigated fields examined, and in inoculation experiments they each produced symptoms comparable to those observed in nature. The maximum degree of infection developed within a fortnight on three-month-old greenhouse plants when inoculum from a soil-maize meal medium was scattered among the crowns and lightly covered with soil. Under these conditions *C. solani* was the most virulent of the three pathogens, and the damage was significantly increased by its admixture with either *F. acuminatum* or *F. avenaceum*.

Hanson (A. A.), Graham (J. H.), & Kreitlow (K. W.). **The isolation of Ladino Clover plants resistant to Sclerotinia trifoliorum.**—*Canad. J. agric. Sci.* [formerly *Sci. Agric.*], 33, 1, pp. 84–90, 1953.

During investigations at Pennsylvania State College and in 12 north-eastern States from 1946 to 1952, inclusive, for the purpose of finding Ladino clover plants with some resistance to *Sclerotinia trifoliorum* [*R.A.M.*, 31, p. 18], about 57,000 cuttings and seedlings of both Ladino and white clover, selected from screening tests of strains, polycross progenies, and clones obtained from uninoculated field plantings, were grain-inoculated with the fungus cultured on a medium composed of two parts wheat and one part oats [cf. ibid., 30, p. 521]. Some of the partially resistant plants, selected by means of repeated clonal tests of survivors, transmitted relatively high resistance to their progenies, F_1 plants from resistant × resistant, for instance, giving an average of 34·9 per cent. healthy survivors during the five greenhouse tests, while the corresponding percentage in the susceptible × susceptible progenies was 10·3, resistant × susceptible progenies being intermediate. Although the method of repeated clonal tests has been effective in isolating some promising material in these trials, it is suggested that the effectiveness of selection would have been increased materially if progeny tests had been used in conjunction with clonal evaluation.

Several genetic factors appear to be involved in resistance, which suggests that it may be possible to obtain a higher level of resistance than that secured so far.

Thomas (H. L.), Duncan (E. R.), Kernkamp (M. F.), Peterson (A. G.), & Schmid (A. R.). **Clovers for Minnesota.**—*Bull. Minn. agric. Exp. Sta.* 415, 27 pp., 6 figs., 5 maps, 1952. [Received May, 1953.]

This publication includes a section (pp. 24–27) on clover diseases in Minnesota and their control.

Thirumalachar (M. J.) & Narasimhan (M. J.). **A new Sclerospora on Dichanthium annulatum.**—*Phytopathology*, 42, 11, pp. 596–598, 1 fig., 1952.

During the period from August to December, a species of *Sclerospora* caused severe damage to the perennial forage grass *Dichanthium annulatum* in the plains of Bihar, India. The fungus was shown by morphological and cross-inoculation studies to differ from *S. philippinensis* on maize [*R.A.M.*, 29, p. 360; 32, p. 427] and *S. sorghi* on sorghum [ibid., 29, p. 504] and is accordingly designated *S. dichanthicola* n.sp. It is characterized by erect conidiophores, always produced at night, emerging from the stomata, 83 to 130 μ long and 13 μ broad at the septum of the single isodiametric basal cell (33 by 13 μ with an inconspicuous knob-like structure at the base) and 17 to 27 μ wide at the point of branching of the main axis; dichotomous primary branches, usually numbering two to six, are 33 to 37 μ in height and 83 to 90 μ in spread, each bearing two or three tapering sterigmata with globose to obovoid conidia, 21 to 28 μ, germinating by means of germ-tubes.

Theis (T.). **An undescribed species of ergot on Panicum maximum Jacq. var. Common Guinea.**—*Mycologia*, 44, 6, pp. 789–794, 1 fig., 1952.

A new species of ergot, *Claviceps maximensis*, found on *Panicum maximum* var. Common Guinea in Puerto Rico is described. Sclerotia (which contain none of the usual ergot alkaloids) form in arid regions, but in more humid localities only the sphacelial stage develops.

Venkatakrishniah (N. S.). **Ephelis on Echinochloa crus-galli Beauv. and Setaria italica Beauv.**—*Phytopathology*, 42, 11, pp. 634–635, 1 fig., 1952.

In November, 1947, and December, 1949, a few plants of *Echinochloa crus-galli* in the midst of rice crops in Mysore, India, were infected by a fungus referred to *Ephelis oryzae* [*R.A.M.*, 28, p. 29]. It caused reduction of the inflorescences and cohesion of the spikelets, both to each other and to the central rachis. Mycelial invasion of the young flowers impeded their further development. Greyish-white, sclerotioid masses were produced, later turning black, and the hyaline, acicular conidia measured 17·5 to 27·5 by 1·5 to 2 μ.

Similar symptoms were observed in October, 1948, on *Setaria italica* on dry land at Bangalore, the inflorescences in severe cases being reduced from their normal dimensions of 3½ to 7 by ½ to ¾ in. to a stiff spike ½ to ⅓ by $\frac{1}{20}$ to $\frac{1}{10}$ in. The conidia measured 14 to 26·5 by 1·5 to 2 μ. The symptoms induced on the two grasses agree with those of the same fungus on rice [ibid., 26, p. 28], but apparently it has not been recorded on either grass in India.

Mulder (D.). **Tuinbouwvoorlichting 1. Voedingsziekten bij fruitgewassen.** [Horticultural intelligence 1. Nutritional diseases of fruit crops.]—63 pp., 24 col. pl., 9 figs., 2 diags., Afdeling Tuinbouw, Directie van de Landbouw, 's-Gravenhage, Holland, 1953. [English summary.] Fl. 1.75.

This is a summary of the available information on the nutritional diseases of fruit crops in Holland [*R.A.M.*, 29, p. 262 *et passim*] and elsewhere.

Wenzl (H.). **Beitrag zur Normung von Schwefelpräparaten auf Grund von Schorfversuchen.** [Contribution to the standardization of sulphur preparations on the

basis of scab experiments.]—*PflSchBer.*, 9, 5–6, pp. 65–79, 3 figs., 1952. [English summary.]

Field experiments for the control of apple scab (*Venturia inaequalis*) at the Austrian Plant Protection Institute, Vienna [*R.A.M.*, 32, p. 195], from 1949 to 1951, inclusive, were concerned with the relation between the particle size and fungicidal efficiency of several sulphur preparations [ibid., 29, p. 107]. Given an equal sulphur content, colloidal sulphurs with a particle dimension below 1 μ, such as thiovit (0·75 per cent.), were more effective than typical wettable sulphurs of a coarser consistency. Of comparable efficacy was the sulphur liberated from a lime-sulphur wash. The lowest effective concentrations of sulphur suspensions and colloidal products were the same for *Oidium tuckeri* [*Uncinula necator*] on vine as for *V. inaequalis*.

Croxall (H. E.), Gwynne (D. C.), & Jenkins (J. E. E.). **The rapid assessment of Apple scab on fruit.**—*Plant Path.*, 1, 3, pp. 89–92, 1 diag., 1952.

Two methods of assessing the amount of scab (*Venturia inaequalis*) on apple fruits are outlined, a visual method by which the progress of scab development on the fruit may be followed during the growing season, and a standard diagram method for use at or after picking. Results obtained by the two methods were in reasonably close agreement. The visual method is similar to that used to estimate leaf infection [*R.A.M.*, 32, p. 385], with five runs of branches on each tree taken as units. One or two infected fruits in occasional units indicate 0·01 per cent. infection on the whole tree, or in each unit 0·1 per cent.; small scab spots on one-quarter of the fruits, 0·5 per cent.; up to five small spots on one-half of the fruit, 1 per cent.; spots on three-quarters of the fruit with occasional cracking, 5 per cent.; on every fruit, 10 per cent.; large spots on every fruit, a quarter of them cracked, and on the whole slightly smaller in size than those from healthy trees, 25 per cent.; one-third of the fruit cracked and non-marketable, generally smaller, 50 per cent.; and one-half non-marketable, appreciably smaller, 75 per cent.

Marsh's standard diagram method [cf. ibid., 27, p. 370] is modified by increasing the number of categories to cover the economically important range of infection. Scabbed area over 1 per cent. exceeds the maximum blemish tolerated for 'Fancy R' grade dessert apples, and over 3·5 per cent. that allowed for 'Domestic R' grade cooking apples. Probably the most accurate procedure, and that used commercially, is to regard each diagram as representing the upper limit of a group, e.g., 3·5 per cent. as the upper limit of that ranging from 2·5 to 3·5 per cent., any apple with just over 2·5 and up to 3·5 per cent. infection entering this category, the mean of which is 3 per cent.

To ascertain whether there was any correlation between the distribution of apples into the grades recommended for marketing purposes and the mean percentage scabbed area for the crop, the latter value was calculated from the standard diagrams for samples of 100 apples, and the apples were then graded. Samples with approximately the same percentage mean scabbed area graded similarly. For routine survey work where it is unnecessary to detect small differences in infection, assessment using the two diagrams corresponding to 'Fancy R' and 'Domestic R' levels appears to offer a simple means of securing a direct measure of the economic loss due to scab attack. The mean percentage scabbed area may be calculated from these results if it is desired to express the amount of scab by a single approximate figure.

Palmiter (D. H.) & Emerson (F. H.). **Results of 1952 tests with fungicide mixtures for the control of Apple scab and Quince rust.**—*Plant Dis. Reptr*, 37, 1, pp. 11–13, 1953. [Multilithed.]

Experiments carried out in 1952 by New York State Agricultural Experiment

Station, Poughkeepsie, in co-operation with the Stauffer Chemical Company, New York City, to evaluate fungicide mixtures against apple scab (*Venturia inaequalis*) [*R.A.M.*, 32, pp. 320, 386] and quince rust (*Gymnosporangium clavipes* and *G. juniperi-virginianae*) confirmed the results of previous tests [ibid., 31, p. 436]. Under Hudson Valley conditions fermate-phygon XL (¾ lb.–¼ lb.–100 gals.) combinations gave very good control and were much better than magnetic '70' sulphur-phygon mixtures (1 and 2 oz. phygon in 4 lb. sulphur paste–100). Fermate-mercury (coromerc = 10 per cent. active N-phenyl mercury ethylene diamine, ¾–¼–100) combinations when used in the cool, early season gave good control without serious injury. Fungicide [orthocide] 406 (1 and 2 lb.–100) showed both protectant and eradicant properties. When used throughout the season it gave better fruit finish than any other treatment. If it proves as effective in further tests it may replace the above-mentioned mixtures.

Blumer (S.). **Neuere Erfahrungen über die Bekämpfung des Apfelmehltaus.** [Recent experiences in the control of Apple mildew.]—*Schweiz. Z. Obst-u. Weinb.*, 62, 4, pp. 57–62, 1 fig., 1953.

In further attempts in 1952 near the Wädenswil Experiment Station, Zürich, Switzerland, to secure effective control of apple mildew [*Podosphaera leucotricha*: *R.A.M.*, 32, p. 260], soft soap at concentrations of 1 or 2 per cent. was added to combinations of the wettable sulphurs Ultraschwefel Geigy, thiovit, and sofril plus a wetter with promising results, especially at 2 per cent. and in the second pre-blossom spray. In the Jonathan variety, however, the treatment produced a shock resulting in marked arrest of leaf growth (sometimes only temporary) and, when applied after flowering, in heavy fruit drop.

Foschi (S.). **La forma ascofora dell'oidio del Melo (Podosphaera leucotricha (Ell. et Ev.) Salm.) in Italia.** [The ascigerous stage of Apple powdery mildew (*Podosphaera leucotricha* (Ell. & Ev.) Salm.) in Italy.]—*Ann. Sper. agr.*, N.S., 6, 5, pp. 1421–1430, 3 figs., 1952. [English summary.]

The author reports the first record on apple in Italy of the ascigerous state of *Podosphaera leucotricha* [*R.A.M.*, 2, p. 294; 30, p. 327, and preceding abstract]. The perithecia were found growing abundantly on different varieties under different ecological conditions.

Pettinari (Carla). **Una macchiettatura delle Mele.** [A spotting of Apples.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 19–29, 2 pl., 1953. [English summary.]

This information concerning apple-spotting by *Pleospora alternariae* f. *fusca* in Italy has already been noticed from another source [*R.A.M.*, 31, p. 125].

Gagnotto (Anna-V.). **Osservazioni su un cancro dei rami di Pero.** [Observations on a canker of Pear branches.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 3–11, 5 figs., 1953. [English summary.]

This information on a canker of pear trees in Italy provisionally ascribed to *Cylindrocarpon mali* has already been noticed from another source [*R.A.M.*, 31, p. 127].

Dunegan (J. C.), Moon (H. H.), & Wilson (R. A.). **A rapid method for mass inoculation of Pear trees with the blight organism.**—*Plant Dis. Reptr*, 37, 1, pp. 14–15, 1953. [Multilithed.]

A description is given of a rapid method (1 to 1½ hours), developed at the Plant Industry Station, Beltsville, Maryland, for the mass inoculation of pear trees with the blight organism (*Erwinia amylovora*) [*R.A.M.*, 32, p. 83]. One side of each tree

is drenched twice during flowering with an aqueous suspension of the bacterium and finely divided pyrophyllite (4 l. beef-broth culture, 600 gals. water, 60 lb. abrasive) by means of a power sprayer and gun at 550 lb. per sq. in. pump pressure. During two seasons 632 trees have been eliminated as susceptible, while 253 have remained free from infection.

Anderson (H. W.). **'Spring canker' or 'black tip' ? of Peach trees.**—*Plant Dis. Reptr*, 37, 1, pp. 16–17, 1953. [Multilithed.]

The author gives reasons for the inappropriateness of the term 'black tip', used to describe peach bacterial blight (*Xanthomonas pruni*) [*R.A.M.*, 32, p. 322], stating that it might be used to describe one type of symptom of the overwintering phase of the disease, but should not be substituted for 'spring canker', a term used in Illinois, where the 'black tip' condition is known as terminal die-back, and is not always due to bacterial invasion.

Blumer (S.). **Die Pfeffingerkrankheit der Kirschbäume.** [The Pfeffinger disease of Cherry trees.]—*Schweiz. Z. Obst-u. Weinb.*, 62, 11, pp. 197–198, 2 figs., 1953.

In connexion with a further extension of the Pfeffinger virus disease of cherries in Switzerland [*R.A.M.*, 32, p. 386], directions for its control by stringent sanitary precautions and the systematic elimination of infected trees are briefly recapitulated.

Raspberry diseases in Scotland.—*Adv. Leafl. Dep. Agric. Scot.*, N.S., 7, 9 pp., 9 figs., 1952.

This is a brief review of the raspberry disease situation, including symptoms and control, in Scotland [*R.A.M.*, 31, p. 614; 32, p. 388].

Miller (P. W.). **Tests of wild Strawberries from California for virus infection.**—*Plant Dis. Reptr*, 37, 1, p. 20, 1953. [Multilithed.]

In further investigations at Oregon Agricultural Experiment Station, Corvallis, on the presence of virus infection in wild strawberry plants [cf. *R.A.M.*, 32, p. 261], *Fragaria vesca* and *F. chiloensis* plants collected from various localities within a mile of the beach along the California coast, mostly far removed from cultivated strawberries, were runner-grafted to healthy *F. vesca* (East Malling strain). Of the 23 plants tested only two (*F. chiloensis*) were found to be infected.

Miller (P. W.). **Percentage of Strawberry plants infected with yellows virus complex by single Strawberry aphids.**—*Plant Dis. Reptr*, 37, 1, p. 19, 1953. [Multilithed.]

In studies at the Oregon Agricultural Experiment Station, Corvallis, only 35 per cent. of *Fragaria vesca* plants (East Malling strain) were infected by the strawberry yellows virus complex [*R.A.M.*, 32, p. 87] when each plant was given a single strawberry aphid (*Capitophorus* [*Pentatrichopus*] *fragaefolii*). Differences in the infective capacity of the aphids are believed to be related to the quantity of virus in the insect and to the dose received by the plant.

Hernández-Medina (E.). **The apparent degeneration of Pineapple slips in Puerto Rico.**—*J. Agric. Univ. P.R.*, 36, 3, pp. 302–317, 1952.

Pineapple growers in Puerto Rico are faced with a serious economic problem due to considerable reduction in pineapple yields caused by the decline in vigour or apparent 'degeneration' of pineapple slips. In 1951 the very low yield of 9·2 tons of fruit per cuedra (0·97 acre) was harvested. When Red Spanish slips from Cuba are grown in Puerto Rico for two generations it is difficult to obtain slips of proper planting size. The disorder has now been reported from Cuba also. As the result, field studies were carried out in Puerto Rico to determine whether this apparent

'degeneration' is due, as previously suggested, to an unfavourable balance between iron and manganese [*R.A.M.*, 25, pp. 70, 127] and whether it is more severe in plants developed from Puerto Rican slips (originally from Cuba) than in Cuban slips planted for the first time in Puerto Rico. The former were superior or equal to the latter and no relation was detected between soluble iron and manganese in the plant tissue and yield, indicating that other factors may be responsible for the disorder.

PETTINARI (CARLA). **Una fusariosi su radici di Opuntia ficus-indica.** [A fusariosis of the roots of *Opuntia ficus-indica*.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 61–67, 2 figs., 1 graph, 1953. [English summary.]

This account of *Fusarium oxysporum* var. *opuntiarum* on roots of *Opuntia ficus-indica* in Sicily has already been noticed from another source [*R.A.M.*, 31, p. 501].

SELLKE (K.). **Die Pflanzenschutzmittel in der Deutschen Demokratischen Republik.** [Plant protectives in the German Democratic Republic.]—*Dtsch. Landw.*, 4, 1, pp. 27–33, 1953.

Information is presented on the composition and application of some seed disinfectants and fungicides comprised in the current list of 150 plant protectives approved for use in the eastern zone of Germany.

Amtliches Pflanzenschutzmittelverzeichnis 1953 der Bundesanstalt fur Pflanzenschutz, Wien. [Official list of plant protectives for 1953 of the Federal Institute for Plant Protection, Vienna.]—*Pflanzenarzt*, 6, *Suppl.* 1, 18 pp., 1953.

The plant protectives officially approved for use in Austria in 1953 are listed with the names of the manufacturers and brief directions for application.

ITZEROTT (H.). **Hochkonzentrierte Pflanzenschutzmittel.** [Highly concentrated plant protectives.]—*Pflanzenschutz*, 5, 4, pp. 58–60, 4 figs., 1953.

It is claimed that highly concentrated plant protectives, especially pastes, do not clog the nozzles of spray machines, and that they are more resistant to washing off by rain than weaker ones.

Proceedings of the Association of Applied Biologists. Systemic fungicides.—*Ann. appl. Biol.*, 39, 3, pp. 429–442, 1952.

In the introduction to this symposium of papers presented at a joint meeting of the Association of Applied Biologists and the Crop Protection Panel of the Society of Chemical Industry in London on 14th March, 1952, R. L. WAIN briefly reviews and discusses recent advances in the study of systemic fungicides [cf. *R.A.M.*, 32, p. 437]. S. H. CROWDY, dealing with techniques in the bioassay of systemic fungicides, states that in his work on the control of chocolate spot of [broad] bean (*B*[*otrytis*] *fabae*) [ibid., 31, p. 445] three methods of estimating the amount of disease present on the leaves have been used: grading on an arbitrary scale, estimating percentage area damaged by comparison with standard diagrams, and measuring diameters of individual lesions. The first two methods are purely subjective estimates and give results that are markedly affected by the actual rate of infection as well as by the size of the individual lesions. Both depend on the uniformity of the method of inoculation. The third method obviates these disadvantages to some extent. Flower damage is assessed as the percentage of dead flowers per inflorescence. Disease assessment is complicated by the fact that there is a marked gradient on the affected plants: fewer and smaller lesions are formed on the youngest leaves, and flowers in the youngest inflorescences are also more resistant. P. W. BRIAN, speaking on antibiotics as systemic fungicides and bactericides,

describes researches at the Butterwick Research Laboratories, Welwyn, Herts., with special reference to griseofulvin [ibid., 30, p. 334]. J. Stubbs describes the evaluation of the systemic fungicidal activity of griseofulvin and other materials at the Hawthorndale Laboratories, Bracknell, Berkshire, by means of *Alternaria solani* on tomato [loc. cit.]. W. G. Keyworth discusses root injury as a factor in the assessment of chemotherapeutants by means of the tomato wilt test using *F. oxysporum lycopersici* [*F. bulbigenum* var. *lycopersici*: ibid., 32, p. 137].

Stapley (J. H.). **Suggestions for low-volume spraying.**—*Comm. Gr., 1953*, 2998, pp. 1239–1240, 1953.

The author describes the conversion of the autoblast machine [*R.A.M.*, 28, p. 337] for low-volume spraying (50 gals. per acre), making possible the coverage of 5 acres in 30 to 40 minutes. The rates suggested per 50 gals. water are: lime sulphur 2½ gals. (pre-blossom), wettable sulphur 8 lb. (post-blossom), and mercury fungicide 2½ lb. (pre- and post-blossom on Bramley and Worcester, but at 1¼ lb. for post-blossom on Laxton's Superb and other apple varieties for which mercury is recommended).

Sörgel (G.). **Über eine neue Kulturmethode für Mikroorganismen.** [On a new culture method for micro-organisms.]—*Züchter*, 21, 10–11, pp. 322–324, 2 figs., 1 diag., 1951. [Received 1953.]

An improved method of culture for fungi, especially of the lower groups, ascomycetes, Ustilaginales, and most fungi imperfecti, and other micro-organisms involves the enclosure of the ordinary Petri dish almost filled with a liquid medium and covered by filter paper within a larger dish, 14 cm. in diameter and 2 cm. in height. The diameter of the filter paper for a Petri dish measuring 5·5 cm. in diameter must be at least 8 cm. The dishes are sterilized in the ordinary way, but the filter paper should be placed in Petri dishes wrapped in grease-proof paper to protect it from steam. Fructifications are produced more rapidly on the filter paper medium than on agar, while the mycelium can easily be washed off for drying and weighing. Large quantities of spores for inoculation tests can also be produced by this technique.

Sattar (A.) & Hafiz (A.). **Researches on plant diseases of the Punjab.**—*Sci. Monogr. Pakist. Ass. Advanc. Sci.* 1, iii+158 pp., 10 col. pl., 40 figs. (1 col.), 32 graphs, 2 maps, 1952. Rs. 12.

This book summarizes the results of specific researches carried out on diseases of field and garden crops and their control at the Section of Plant Pathology, Punjab Agricultural College and Research Institute, Lyallpur, Pakistan, since its establishment in 1928. There are 13 chapters dealing, respectively, with diseases of wheat (pp. 1–42), gram (*Cicer arietinum*) (pp. 43–68), sugar-cane (pp. 69–85), cotton (pp. 86–97), rice (pp. 98–100), sorghum (pp. 101–107), pulses (pp. 108–110), oil seeds and oil-seed crops (pp. 115–121), tobacco (pp. 122-125), vegetables (pp. 126–139), and fruit trees (pp. 140–152). Chapter VIII (pp. 111–114) deals with cultural methods of controlling certain smut diseases, and XIII with comparative studies of the fungi causing root and stem rot (*Rhizoctonia* sp.) and blight diseases (*Phyllosticta* spp. and *Phoma* spp.) of certain plants (pp. 153–158). Each chapter is provided with a comprehensive summary and a list of references, many to unpublished work.

Foot rot of wheat, previously attributed to white ant attack, has been found to be caused by *Helminthosporium sativum*. Infection by new or partial bunt of wheat (*Neovossia indica*) [*R.A.M.*, 30, p. 601] is intimately connected with weather conditions; high humidity and comparatively lower temperatures at the time of ear formation are conducive to development of the disease.

Sugar-cane mosaic virus [ibid., 30, p. 628] has no effect on many of the varieties

grown in the Punjab, but sugar-cane yellowing mosaic virus (Sattar (A.) & Singh (S.). Yellowing disease of sugar-cane (a new virus disease) and its control.—*Seas. Notes Punjab agric. Dep.*, 19, pp. 97–101, 1941) causes severe stunting and reduction in the yield of cane. The least susceptible variety is Co. 453.

A serious disease of sorghum in the Punjab is long smut (*Tolyposporium filiferum*) [*T. ehrenbergii*: *R.A.M.*, 29, p. 152]. This disease generally attacks the April and May sowings, the June one being almost free. Control measures include seed disinfection and crop rotation. Red leaf spot of sorghum [cf. ibid., 32, p. 17] is caused by two fungi, *Phyllosticta sorghum* [ibid., 28, p. 489] and *Colletotrichum graminicola* [cf. ibid., 31, p. 536]; control of these is by soaking the seed in cold water for four hours followed by hot water (130° F.) for 1½ hours.

Linseed wilt (*Fusarium lini*) [C.M.I. map No. 32] is an important disease, up to 80 per cent. of the crop being lost in an unfavourable year. Tests of 64 linseed varieties showed a high degree of resistance in derivatives P.174, P.186 and P.189 from the cross C 12–4×Danubian, P.16 and P.260 from Danubian×C.123, and P.11 and P.12 from Danubian×T.5.

Die-back of chillies, caused by *Vermicularia* [*Colletotrichum*] *capsici* [*R.A.M.*, 32, p. 177] and *Gloeosporium piperatum*, is more severe in wet weather. The least susceptible crop is that sown in March and April by broadcasting.

Kamat (M. N.). **Practical plant pathology.**—viii+200 pp., 64 pl., 5 figs., Prakash Publishing House, Poona 2, India, 1953. Rs. 12 inland, 16*s.* overseas.

This manual, designed to meet the practical needs of undergraduate students, comprises sections on phytopathological methods, the study of fungi, diseases of plants caused by different groups of fungi, plant viruses, and miscellaneous diseases, supplemented by special chapters on the principles of plant disease control, elementary taxonomy of Eumycetes, and laboratory technique, and a glossary of mycological terms.

Braun (H.) & Riehm (E.). **Krankheiten und Schädlinge der Kulturpflanzen und ihre Bekämpfung. Siebente neubearbeitete Auflage.** [Diseases and pests of cultivated plants and their control. Seventh revised edition.]—iv+339 pp., 289 figs., 1 diag., Berlin, Paul Parey, 1953. DM. 24.80 in boards, DM. 26.80 in cloth.

The practical and theoretical importance now attached to plant protection in Germany was reflected in an increasingly wide demand for the previous edition of this treatise [*R.A.M.*, 30, p. 53] and its consequent exhaustion in three years. A new feature of the present edition is a section (pp. 298–299) on boron deficiency in the vine [ibid., 32, p. 363].

The Queensland agricultural and pastoral handbook. Insect pests and diseases of plants. Vol. III. 2nd edition.—v+560 pp., 311 figs., Brisbane, A. H. Tucker, Government Printer, 1951. [Received 1953.]

The original text of this volume [*R.A.M.*, 18, p. 125] has been drastically revised, particularly with regard to control recommendations in the section on entomology, and brought up to date. Much new material, written by officers of the Queensland Department of Agriculture and Stock, has been incorporated.

Hopkins (J. C.). **Long-term botanical research.**—African Regional Scientific Conference, Johannesburg, October 17 to October 28, 1949. II. Statements and Communications, pp. 180–182, 1 diag., 1949–50. [French summary. Received 1953.]

The author expresses the view that long-term botanical research should be established on a regional basis in Africa south of the Sahara. The existing botanical

departments in the different sub-regions should be controlled by a Botanical Council consisting of representatives of each sub-region and having its headquarters in Pretoria. More attention should be given to experimental taxonomy and genetics in the delineation of species, and more intensive research is required on the breeding of resistant varieties of crop plants and the physiology of nutrition in Africa. A botanical organization to cover central Africa should be established. The finances of the Botanical Council should be established on a quota system, each sub-region contributing an agreed proportion of the total sum required for each five-year period.

Vasil'kov (B. P.). Съедобные и ядовитые грибы. [Edible and poisonous fungi.]—134 pp., 20 col. pl., 61 figs., Moscow and Leningrad, U.S.S.R. Academy of Sciences Printer, 1948. 10 roubles.

This well-illustrated book, written with the intention of drawing a clear distinction between edible and poisonous fungi in the central belt of the European part of the U.S.S.R. for the benefit of collectors of edible fungi, covers 154 species and varieties of the latter, six poisonous, and 14 non-edible kinds which resemble the edible ones and might, therefore, be confused. The study is based largely on the author's personal observations and on herbarium specimens in the Komarov Institute of Botany, U.S.S.R. Academy of Sciences. Information is given about the food value, best use, and growth conditions, and tables depict the fruiting period of each species.

Pady (S. M.) & Kelly (C. D.). **Numbers of fungi and bacteria in transatlantic air.** —*Science*, 117, 3048, pp. 607–609, 1953.

Preliminary findings are given of continuous samples of fungi and bacteria taken on two flights in June and August, 1951, from Montreal to London and back [cf. *R.A.M.*, 32, p. 439]. Fungi were more numerous than bacteria in all. Polar air had very low numbers of both bacteria and fungi, whereas tropical air had higher numbers, fungi greatly outnumbering bacteria. In one tropical air mass 8·8 fungi per cu. ft. were recorded. Large numbers of spores were either non-viable or unable to grow on the media used. One air mass over land was identified by meteorologists as polar, though the high number of spores present indicated a tropical continental origin.

Wisłocki (S.). **Liofilizacja.** [Lyophilization.]—*Acta Microbiol. polonica*, 2, 1, pp. 15–33, 3 figs., 1 diag., 1953.

A description is given of a new lyophilization apparatus [cf. *R.A.M.*, 31, p. 568] which was developed in Poland in 1952.

Locquin (M.). **L'emploi des filtres interférentiels en mycologie.** [The use of interference filters in mycology.]—*Bull. Soc. mycol. Fr.*, 68, 2, pp. 170–171, 1952.

The use of a variable monochromatic light provided by an interference filter makes it possible to detect weak shades of colour and small details in highly coloured objects. By this means it is possible, for example, to see that only the endospore of the chromosporous *Russula* spp. is coloured and to distinguish, after staining with cresyl blue, between the red internal endospore and the violaceous outer endospore of *Leucocoprinus*.

Locquin (M.). **Nouveau réactif pour l'étude des structures membranaires fines chez les champignons.** [A new reagent for the study of fine wall structures in fungi.] —*Bull. Soc. mycol. Fr.*, 68, 2, pp. 172–174, 1952.

The mode of preparation is given of a new reagent (iodomercury glycerin), con-

sisting essentially of a saturated solution of iodine potassium iodide in a solution of iodine mercuric chloride in glycerin. It has a high refractive index and is miscible with water and all aqueous solutions, which facilitates the examination, with or without staining, of cell walls. It renders the cell contents invisible.

Locquin (M.). **Nouveau réactif pour l'étude des spores des Astérosporés.** [A new reagent for the study of the spores of the Asterosporeae.]—*Bull. mens. Soc. linn. Lyon*, 21, 5, pp. 119–120, 1952. [Received July, 1953.]

Most of the information in this paper has been noticed from another source [see preceding abstract]. Used in conjunction with chloral hydrate, iodine mercury chloride renders visible minute details of spore ornamentation.

Marsh (P. B.). **A test for detecting the effects of micro-organisms and of a microbial enzyme on Cotton fiber.**—*Plant Dis. Reptr*, 37, 2, pp. 71–76, 1953. [Multilithed.]

A new method for measuring the effect of micro-organisms and other deteriorative agents on cotton fibre [cf. *R.A.M.*, 31, pp. 326, 506] consists in swelling a known weight of fibre in sodium hydroxide solution, centrifuging off the interfibrillar liquid, and determining the percentage weight increase, or 'alkali-centrifuge value' which rises with any damage to the fibre walls. When strips of cotton fabric were dusted with *Cladosporium* spores and incubated this value increased materially even though the strength of the fabric remained unchanged. Filtrates from cultures of *Myrothecium verrucaria* [ibid., 30, p. 623] increased the alkali-centrifuge value only when the culture medium contained some form of cellulose, the principal active factor probably being cellulase or some element of the cellulase complex. Under suitable conditions *Circinella sydowi*, *Cunninghamella* sp., *Mucor hiemalis*, *Mortierella alpina*, and *Zygorrhynchus* sp. increased the degree of alkali-swelling, indicating that response to alkali is more sensitive than the strength-loss response of earlier experiments that led to the conclusion that mucoraceous fungi are non-cellulolytic [ibid., 30, p. 115].

Shumard (R. S.). **Mildew control. Possibilities of paradichlorobenzene as an aid in preventing damage by mildew.**—*Soap*, 29, 3, pp. 150–151, 153, 171–173, 3 figs., 1953.

Experiments are reported from the Organic Chemicals Division, Monsanto Chemical Co., St. Louis, Missouri, demonstrating the efficiency of paradichlorobenzene [*R.A.M.*, 30, p. 114 *et passim*] in the control of mildew on shoes, samples of 8-oz. canvas duck and white wool cloth, and a book, all inoculated with spore suspensions of *Aspergillus niger*, *A. ustus*, *Penicillium* sp., *Chaetomium globosum*, and *Myrothecium verrucaria* [see preceding abstract].

Camposano (Anna). **Una nuova specie di Zygosporium (Zygosporium chartarum).** [A new species of *Zygosporium* (*Zygosporium chartarum*).]—*Nuovo G. bot. ital.*, N.S., 58, 2, pp. 355–361, 1 pl., 5 figs., 1951. [English summary. Received 1953.]

An account is given of *Zygosporium chartarum* n.sp. isolated from a book in the library of the Germanic Institute, Rome.

Nicot-Toulouse (Jacqueline). **Deux Phoma isolés sur plâtre humide.** [Two *Phoma* isolates from damp plaster.]—*Bull. Soc. mycol. Fr.*, 68 (*1952*), 3, pp. 352–358, 1953.

Full descriptions are given of *Phoma pigmentivora* [*R.A.M.*, 31, p. 199] and *P. hibernica* [loc. cit.] isolated from a wine merchant's vaults near Paris, the former from the damp plaster and cement, the latter from cement only.

Minich (A.) & Goll (M.). **Mould growth on painted surfaces. Its cause, its diagnosis, and its prevention.**—*Paint Tech.*, 17, 202, pp. 426–429, 5 figs., 1952.

Information previously presented on paint moulds (including *Phoma* and *Pullularia* spp.) [*R.A.M.*, 32, p. 142 *et passim*] is recapitulated, with the additional mention of cresol mercury naphthenate at 0·25 to 0·5 per cent. as a highly effective fungicide.

Reckendorfer (P.). **Ein Beitrag zur Mikrochemie des Rauchschadens durch Fluor. Die Wanderung des Fluors im pflanzlichen Gewebe.** [A contribution to the microchemistry of smoke damage by fluorine. The movement of fluorine in plant tissue.]—*PflSchBer.*, 9, 3–4, pp. 33–55, 1952. [English summary.]

By means of a microanalytical method devised at the Federal Plant Protection Institute, Vienna, the author differentiated the inorganic and organic (ether-soluble) fractions of the total fluorine content of cherry and pear leaves and spruce needles damaged by industrial fumes [*R.A.M.*, 31, p. 74; 32, pp. 47, 394]. The total deposit of fluorine in the cells was found to range from 10^{-1} to $10^{-5}\gamma$.

Benedict (R. G.). **Antibiotics produced by Actinomycetes.**—*Bot. Rev.*, 19, 5, pp. 229–320, 1953.

An alphabetical classification is given of the various antibiotics produced by actinomycetes [*R.A.M.*, 29, p. 632], their chemical, physical, and biological properties being dealt with in detail. A bibliography of 348 titles is appended.

Mosse (Barbara). **Fructifications associated with mycorrhizal Strawberry roots.**—*Nature, Lond.*, 171, 4361, p. 974, 1 fig., 1953.

In 1951 light brown, spherical fructifications of the *Endogone* type [cf. *R.A.M.*, 17, p. 263] up to 1 mm. in diameter, consisting of a loose weft of hyphae containing two to six, sometimes up to 32, yellow to brown spores 92 to 197 μ in diameter, were found attached to mycorrhizal strawberry roots growing in pots at East Malling Research Station, Kent. Hyphal connexions were traced to the mycorrhizal fungus inside the root. Typical mycorrhizal infections were induced in strawberry seedlings in sterilized soil inoculated with the fruit bodies and sterilized, excised spores.

Dos Santos (Natalina F.) & Dos Santos (Aniceta C.). **Algumas notas sobre micorrizas nas Orquidáceas.** [Some notes on mycorrhiza in Orchidaceae.]—*Publ. Dir. Serv. flor. aquic., Lisboa*, 18, 1, pp. 85–96, 3 pl., 1951. [English summary.]

An endophyte was found in the roots of all the wild and cultivated orchids [cf. *R.A.M.*, 26, p. 165] collected in Portugal [cf. next abstract]. The development of the typical mycelial pelotons was particularly conspicuous in the outer cortical layer, which may also become involved in the digestive process occurring in the mid- and inner cortex. The initial stages of development of the endophyte are best observed in seedlings eight or ten days after germination. The application of colchicine to the roots of two wild species stimulated aerial growth but the flowers were sterile. Histological examination of the treated roots revealed far-reaching changes in the hyphae and a culture of the endophyte was killed by the addition of 7 ml. colchicine to the medium.

Dos Santos (Natalina F.). **Notes on Portuguese mycorrhizae.**—*Publ. Dir. Serv. flor. aquic., Lisboa*, 18, 2, pp. 97–109, 4 pl., 1951. [Received May, 1953.]

The author has detected ectotrophic mycorrhiza in the following trees [cf. *R.A.M.*, 31, p. 622] in Portugal: various pines and other conifers, birch (*Betula maximoviczii*), chestnut, beech, oaks (*Quercus* sp.), and *Eucalyptus globulus*. Among the 31 trees and plants with endotrophic mycorrhiza were *Podocarpus*

variegatus, *Sequoia sempervirens*, *S. washingtoniana* [*S. gigantea*], *Cryptomeria japonica*, *Cupressus lusitanica*, *Casuarina equisetifolia*, *Platanus orientalis*, and various species of orchids [see preceding abstract].

Dos Santos (Natalina F.). **Micorrizas de Quercus suber L.** [Mycorrhiza of *Quercus suber* L.]—*Publ. Dir. Serv. flor. aquic., Lisboa*, 18, 1, pp. 5–13, 4 pl., 1951. [English summary.]

From the same mother root of a healthy cork oak (*Quercus suber*) in Portugal the author isolated three types of mycorrhiza, A, B, and Dn [cf. *R.A.M.*, 22, p. 266]. The white, smooth, glossy, undifferentiated mantle of A forms a regular, unbroken cover over the roots. The hyphae are slender and septate. The dirty white, flaky mantle of B, irregularly distributed along the short roots, is composed of two strata, the septate, flask-shaped hyphae extending into the soil. Dn produces a dark mycelium composed of stout, septate hyphae, which occur in bundles in the pseudoparenchymatous mantle. In A and B Hartig's network occurs only in the first layer of the cortex; in Dn it is well developed. Dn yielded a black mycelium which is tentatively referred to *Cenococcum graniforme* [*C. geophilum*: ibid., 31, p. 292].

Plüghan (A.). **Das Immunitätsproblem in der Phytopathologie.** [The immunity problem in phytopathology.]—*Dtsch. Landw.*, 4, 1, pp. 22–27, 1953.

This critical survey of the immunity problem in phytopathology [*R.A.M.*, 32, p. 269] is based on 24 contributions to the literature.

Hirschhorn (Elisa). **Variaciones en Ustilago zeae.** [Variants of *Ustilago zeae*.]—*Cienc. e Invest.*, 9, 4, pp. 158–165, 18 figs., 1953.

At the Laboratory of Genetics of Pathogenic Fungi, Phytotechnical Institute, Castelar, Argentina, a study was made of the effect of formaldehyde on chlamydospores and monospore cultures of *Ustilago zeae* [*U. maydis*: *R.A.M.*, 31, p. 13] from maize, *U. scitaminea* from sugar-cane, and *U. bullata* from *Bromus* spp. *U. scitaminea* tolerated formaldehyde vapour for two minutes and *U. bullata* for four minutes, but both were intolerant of 0·01 to 0·05 per cent. incorporated in 2 per cent. potato glucose agar. *U. maydis* was much less tolerant, one minute's exposure to the vapour being the limit for the chlamydospores. Only seven sporidia, out of approximately 20,000 individuals or sporidia exposed, showed any resistance. Of these, two, belonging to chlamydospore VIII–1 of *U. maydis*, differed from the parent strain and all known strains of this fungus in forming a chlamydospore-type colony with inflated, deformed hyphae and sporidia and reproducing asexually through many generations for more than 18 months. The pathogenicity of the variant was unimpaired, but the abnormalities were not perpetuated by sexual reproduction. In dilution culture it tolerated formaldehyde vapour for up to 1 minute 45 seconds but not 2 minutes' exposure. In a medium containing 0·01 per cent. formaldehyde it grew only when needle-inoculated and not in the dilution series, reaching 16 mm. in diameter after 28 days. Transplants from this colony treated with formaldehyde at 0·01 per cent. attained a diameter of 30 mm. after 16 days, but 0·05 per cent. retarded growth.

The occurrence of the variant demonstrates the need for studying the mutagenic properties of formaldehyde vapour.

Aytoun (R. S. C.). **The genus Trichoderma : its relationship with Armillaria mellea (Vahl. ex Fries) Quél. and Polyporus schweinitzii Fr., together with preliminary observations on its ecology in woodland soils.**—*Trans. bot. Soc. Edinb.*, 36, Part II, pp. 99–114, 1 pl., 1953.

At the Department of Botany, University of Edinburgh, the author grew ten

isolates of *Trichoderma viride* from soils in turn with two of *Armillaria mellea* on malt agar smears and established the parasitism of all the isolates of *T. viride* at pH 3·4 to 5·1 [cf. *R.A.M.*, 30, p. 608]. On a medium of pH 7 no signs of parasitism could be detected. Proximity to *A. mellea* stimulated conidial production by *T. viride*. By a similar method *Trichoderma* was found to parasitize *Polyporus schweinitzii* at a pH of 3·4 but not at the higher levels. The hyphae of the *Trichoderma* coiled round those of the host, penetration occasionally being observed, and eventually the host hyphae began to deteriorate. *T. viride* was found to be a typical member of an acid woodland soil flora. The behaviour of these fungi in culture is not necessarily an indication of what happens when they are surrounded by soil and all the other microbiota; but it is clear that under certain conditions both *A. mellea* and *P. schweinitzii* are parasitized by *Trichoderma*, both, however, being more resistant than *Rhizoctonia* [*Corticium*] *solani* [ibid., 32, p. 27] or *Fomes annosus* [ibid., 30, p. 295]. It seems possible that *Trichoderma* controls *A. mellea* in more acid soils, but since soils with a pH 3·4 are rare, little influence on *P. schweinitzii* is likely.

Fries (N.). **Further studies on mutant strains of Ophiostoma which require guanine.**—*J. biol. Chem.*, 200, 1, pp. 325–333, 2 graphs, 1953.

Investigations at the Institute of Physiological Botany, University of Uppsala, Sweden, on the responses of several guanine-less mutants of *Ophiostoma multiannulatum* [*Ceratostomella multiannulata*: *R.A.M.*, 30, p. 339] to various purines and purine derivatives are reported.

Rönnebeck (W.). **Versuche zur Minderung der Virusverseuchung von Kartoffelpflanzgut. (Vorläufige Mitteilung).** [Experiments in the reduction of virus infection of Potato 'seed'. (Preliminary note).]—*NachrBl. dtsch. PflSchDienst (Braunschw.), Stuttgart*, 4, 12, pp. 189–190, 1952.

In recent experiments at Goch on the Rhine, Germany, the incidence of the potato viruses leaf roll and streak [virus Y] was reduced by from 68 to 93 per cent. in Erdgold and 80 to 87 per cent. in Bona by a combination of roguing and four applications of systox (Bayer 8169) for the extermination of the peach [-potato] aphid (*Myzodes* [*Myzus*] *persicae*) [*R.A.M.*, 31, p. 349 and next abstract].

Hey (A.). **Verbreitung und Bekämpfung virusübertragender Blattläuse in Beziehung zum Auftreten von Kartoffelvirosen in Nachbau.** [Distribution and control of viruliferous aphids in relation to the occurrence of Potato viroses in the progeny.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., 6, 10, pp. 181–187, 1952.

A tabulated survey is given of experiments in 1949 and 1950 on the control of viruliferous aphids on potatoes by frequent insecticidal treatments in the eastern zone of Germany [see preceding abstract], where the degree of infestation was moderate in both years. Although the aphids were practically exterminated by wolfatox at 0·1 per cent., the incidence of viroses was not appreciably reduced and no clear-cut correlation could be established between the density of the aphid population and virus dissemination. In other words, effective spread of the diseases can be accomplished by very small numbers of aphids under favourable ecological conditions. Thus, even the most intensive schedule of direct insecticidal treatment of potato crops is unlikely to confer protection against the risk of heavy virus infection. A more hopeful solution of the problem lies in the treatment of neighbouring stands and the formation of compulsory seed production areas ('health islands').

Rich (A. E.). **Some suggestions for indexing Potato tubers.**—*Amer. Potato J.*, 29, 7, pp. 170–172, 1 fig., 1952.

The author describes a number of improvements he has devised in potato tuber

indexing [cf. *R.A.M.*, 31, p. 509], involving the use of a ball-point pen for numbering tubers, a salad baller for removing 'eyes', a solution of ethylene chlorhydrin (30 c.c. in 970 c.c. water) for breaking dormancy, moist peat moss or vermiculite for suberization, avoidance of nitrogen (which sometimes masks leaf roll symptoms), and a growing temperature of 70° F.

HUTTON (E. M.) & WARK (D. C.). **A relationship between immunity and localized reaction to virus X in the Potato (Solanum tuberosum).**—*Aust. J. sci. Res.*, Ser. B, 5, 2, pp. 237–243, 1952.

Studies were carried out at the Division of Plant Industry, Canberra, Australia, on the pattern of development of potato virus X in inoculated leaves of the potato phenotypes immune 11–84, the localized reacting Epicure and 47–20, and the susceptible Factor [Up-to-Date: cf. *R.A.M.*, 22, p. 76; 31, p. 510]. Disks of tissue were removed at intervals from inoculated leaves and tested for the virus on *Datura stramonium* and globe amaranth [*Gomphrena globosa*]. The results indicated that immunity is not absolute as an early, limited virus development occurs. Phenotypes with a localized reaction are not hypersensitive but resistant, virus multiplication being restricted directly infection takes place. These findings and similar inoculation tests of F_1 seedlings from intercrosses between the various phenotypes suggested that a common virus-inactivating system determines both types of resistance. The necrotic reaction of Epicure and its derivatives is not necessary to the primary virus-inactivation process, but is a side reaction, a view supported by the fact that the majority of resistant F_1 seedlings, which reacted necrotically, did not do so later as tuber progeny. A biochemical understanding of the virus-inactivating system is required before the relationships shown can be proved or disproved.

The difference between localized resistance and immunity may be determined by different tetraploid conditions of a common major gene. Taking the results of Cadman's researches on autotetraploid inheritance in the potato [ibid., 22, p. 151] into consideration, together with those of Stevenson, Schultz, and Clark [ibid., 18, p. 544], as well as the ratios of resistant or immune to susceptible phenotypes obtained in the present experiments, the authors suggest that the recessive allelomorph of a gene in the nulliplex condition results in immunity, while the dominant allelomorph in the quadruplex condition gives complete susceptibility. The simplex and duplex conditions could give phenotypes with localized reactions, that resulting from the former being the more efficient. Phenotypes reacting with severe systemic necrosis would be dependent on the triplex condition. The operation of the major gene as suggested is no doubt tempered by polygenes.

KIRKPATRICK (H. C.) & ROSS (A. F.). **Aphid-transmission of Potato leafroll virus to solanaceous species.**—*Phytopathology*, 42, 10, pp. 540–546, 1953.

When *Physalis floridana* and *P. angulata* seedlings were used as test plants for potato leaf roll virus [*R.A.M.*, 27, p. 493 and next abstract] at Cornell University, Ithaca, New York, *Myzus persicae* proved to be a more efficient vector than *M. convolvuli* or *Macrosiphum solanifolii* [*M. euphorbiae*]. In further tests with *Myzus persicae*, *P. floridana* was superior to *Datura stramonium* as a source of inoculum, while *P. angulata* was poorer than either of the foregoing but better than potato. The older leaves of potato were richer in infective material than the younger ones [cf. ibid., 31, p. 624].

On *P. angulata* the probability of infection by a colony of aphids during a six-day feeding period was consistently less than the likelihood that the colony contained at least one individual capable of causing infection if alone. Viruliferous aphids feeding alone infected more plants than did similar ones in association with five or ten non-viruliferous individuals. It is inferred from these observations that aphid

feeding causes changes in the plants tending towards resistance to systemic infection.

Some aphids succeeded in transmitting the virus after 30-minute acquisition periods on infected *D. stramonium*. Aphids reared on diseased plants infected *P. floridana* during 30-minute test feeding periods. The protraction of any test feeding period up to 24 hours or so led to an increase in the number of infections. Aphids allowed to feed on infected *P. floridana* for 30 minutes were able to transmit the virus to healthy plants of the same species within an hour after leaving the virus source. It would appear from these results that there is no fixed latent period of potato leaf roll virus in its aphid vector but rather a time of low probability of infection due to the altered feeding accompanying movement to different hosts.

ROLAND (G.). **Quelques recherches sur l'enroulement de la Pomme de terre (Solanum virus 14, Appel & Quanjer).** [Some researches on leaf roll of Potato (*Solanum* virus 14, Appel & Quanjer.]—*Parasitica*, 8, 4, pp. 150–158, 1 pl., 1952.

Studies at the State Phytopathological Station, Gembloux, Belgium, demonstrated that the aphid *Rhopalosiphoninus latysiphon* is able to transmit the potato leaf roll virus. The best test plant for identification of the virus is *Physalis angulata* [see preceding abstract]. Exposure of affected tubers to a moist atmosphere at 37·5° C. for 25 days eliminated the virus from a certain percentage and from a smaller number after similar exposure at 44° for five days.

BERCKS (R.). **Vergleichende Untersuchungen über den X-Virus-Befall an Laub und Knollen einer Kartoffelsorte durch Primärinfektion.** [Comparative studies on the X-virus attack on foliage and tubers of a Potato variety through primary infection.]—*NachrBl. dtsch. PflSchDienst (Braunschw.), Stuttgart*, 5, 3, pp. 37–38, 1953.

In further studies at the Brunswick branch of the Biological Institute the author sought to determine how far the mild foliar infection of the Flava variety resulting from inoculation with potato virus X [*R.A.M.*, 32, p. 143] corresponded to tuber involvement, and whether testing of the mother plants in such cases would afford any clue to the state of health of the progeny.

In one experiment on 89 plants 116 (27 per cent.) of the shoots and 155 (31 per cent.) of the tubers were diseased, while in another the entire aerial system of 40 plants and over 95 per cent. of the 488 tubers were healthy. Evidently, therefore, foliar tests are sufficiently reliable, even in cases of mild primary infection, as an index to the degree of invasion of the whole plant, including the daughter tubers.

SUGI (T.), MIYAMOTO (K.), & SHIMIZUGUCHI (T.). **The relation between the infection of Potato virus disease and seasonal variation of aphids population in the warmer region of Japan, with special reference to the translocation of virus poison.**—*Proc. Crop Sci. Soc. Japan*, 19, 1–2, pp. 137–142, 4 graphs, 1950. [Japanese, with English summary. Received June, 1953.]

The correlation between infection by [unspecified] potato viruses in Japan [*R.A.M.*, 31, p. 203; 32, p. 335] and the seasonal variation in aphid populations was studied at the Chûgoku branch farm during 1946, 1947, and 1948. In the Himeji district potatoes were colonized mainly by *Myzus persicae* and *Aphis gossypii*, beginning about the end of April, reaching a maximum at flowering time a month later, and terminating about mid-June. In the autumn crop infestation began early in October and ended by 10th December; aphids were generally more numerous than in spring but virus incidence was not higher. The rate of increase in virus infection was closely related to the number of aphids. From 20 to 30 days were required for virus translocation from leaves to tubers [cf. ibid., 32, p. 445];

seed tubers harvested in spring within about 20 days of maximum aphid infestation should, therefore, be practically virus-free.

Grainger (J.). **Potato blight forecasting and its mechanization.**—*Nature, Lond.*, 171, 4362, pp. 1012–1014, 1 fig., 1 diag., 1 graph, 1953.

From experience gained in western Scotland on the forecasting of potato blight (*Phytophthora infestans*) according to Beaumont's principles [*R.A.M.*, 30, p. 537] the author indicates the need for more reporting stations. A description is given of the Auchincruive self-calculating blight forecast recorder, an inexpensive, accurate, easily interpreted instrument in which the recording elements are bimetallic coils. Temperature is recorded graphically and a 'calculator'-pen is calibrated to give a line coinciding with the temperature line at a relative humidity of 75 per cent.

Lynch (P. B.). **Potato variety trials.**—*N.Z. J. Agric.*, 86, 4, p. 321, 1 fig., 1953.

During the five-year trials conducted by the Extension Division of the Department of Agriculture, Wellington, in various parts of New Zealand for potato varietal reaction to blight [*Phytophthora infestans*: *R.A.M.*, 26, p. 232] none of the varieties tested was immune. The highest degree of resistance was shown by Sebago [ibid., 31, p. 628] (susceptible to black leg [*Erwinia carotovora*: ibid., 16, p. 631, 32, p. 448], which may be severe in poorly drained areas) and Aucklander Tall Top, followed by Iron Duke, Glen Ilana, and Dakota in descending order.

Bazán de Segura (Consuelo). **Razas fisiológicas de Phytophthora infestans en el Peru. Investigaciones sobre resistencia de especies, variedades e hibridos de Papa al P. infestans 1951.** [Physiologic races of *Phytophthora infestans* in Peru. Investigations on the resistance of species, varieties, and hybrids of Potato to *P. infestans* in 1951.]—*Bol. Cent. Invest. agríc., Lima*, 46, pp. 1–14, 1952. [Mimeographed.]

Three physiologic races of *Phytophthora infestans* were recognized in Peru [*R.A.M.*, 30, pp. 188, 536; cf. ibid., 32, p. 206] in 1951, one corresponding to race A [loc. cit.], characterized by sparse mycelial growth, small sporangia, and minimum virulence; another to D, with normal mycelial development, sporangia of intermediate size, and moderate virulence; and the third to C, having abundant mycelium, the largest sporangia, and the greatest virulence. C caused up to 100 per cent. foliar infection and attacked the stems of *Solanum andigenum* and other wild *S.* spp. but not *S. longipedicellatum*, *S. juglandifolium*, *S. polyadenium*, and various selections of *S. antipoviczii* and *S. demissum* [cf. ibid., 29, p. 352].

Wenzl (H.) & Demel (Johanna). **Untersuchungen über den Pflanzgutwert fadenkeimiger Kartoffelknollen.** [Studies on the 'seed' value of spindle sprouting Potato tubers.]—*Bodenkultur*, 6, 1, pp. 41–54, 1 fig., 1 graph, 1952.

The yields from potato plants growing from tubers with spindle sprout in eastern Austria [*R.A.M.*, 31, p. 574] average only 10 to 40 per cent. of the normal, but under favourable growth conditions the originally weak plants may recover to an appreciable extent. The progeny of spindle sprouting tubers are no more inclined to develop the same condition than the offspring of normal 'seed', but rather less so, in fact, especially in the case of early varieties like Frühbote, Sieglinde, and Allerfrüheste Gelbe. This may be explained by the early backwardness of such plants and their consequently reduced liability to the wilt caused by *Colletotrichum* [*atramentarium*: see next abstract] and similar forms of decay culminating in spindle sprout. There is no reason to suppose, from the results of these studies, that spindle sprout is connected with a transmissible disease.

Wenzl (H.). **Bekämpfung der Colletotrichum-Welkekrankheit der Kartoffel durch Strohbedeckung des Bodens.** [Control of *Colletotrichum* wilt disease of the Potato by means of a straw mulch on the soil.]—*PflSchBer.*, 10, 3–4, pp. 33–39, 1953. [English summary.]

The results of experiments in eastern Austria in 1951 and 1952 demonstrated the efficacy of a straw mulch of about 70 kg. per 100 sq. m., applied immediately after hilling, for the control of *Colletotrichum* [*atramentarium*: see preceding abstract]. The incidence of infection was reduced from 7·7 to 0·87 per cent. in 1952, the yields increased by 12 or 15 per cent., and the proportion of small tubers (2 to 3 cm.) diminished.

Baribeau (B.). **Verticillium wilt and seed Potato certification.**—*Amer. Potato J.*, 29, 7, pp. 157–159, 1952.

Brief notes are given on the symptoms, transmission, and control of *Verticillium* wilt of potatoes [*V. albo-atrum*: cf. *R.A.M.*, 31, pp. 350, 628; 32, p. 448] in Canada, and on the degree of tolerance of wilt diseases (*Fusarium* sp. and other wilts) allowed by the Canadian system of certification [ibid., 32, p. 275], viz., 2 per cent. at the first inspection and 1 per cent. at the second for 'seed', 1 and 0·5 per cent., respectively, for Foundation A tubers, and 0·1 for Foundation A 'seed'.

Boyd (A. E. W.). **Dry-rot disease of the Potato. IV. Laboratory methods used in assessing variations in tuber susceptibility. V. Seasonal and local variations in tuber susceptibility. VI. Varietal differences in tuber susceptibility obtained by injection and riddle-abrasion methods. VII. The effect of storage temperature upon subsequent susceptibility of tubers.**—*Ann. appl. Biol.* 39, 3, pp. 322–357, 1 pl., 3 graphs, 1952.

Continuing his studies on potato dry rot (*Fusarium caeruleum*) [*R.A.M.*, 31, p. 626] at the Plant Pathology Laboratory, East Craigs, Corstorphine, Edinburgh, the author describes a laboratory method in which a modified 1 ml. hypodermic syringe was used for tuber inoculation. The needle was cut off and the hole soldered, another hole 1 mm. in diameter being bored in the side of the needle block 2 mm. from the end. The tuber could thus be wounded to a uniform depth of 7 mm. by forcing the needle block into the tissue. The syringe was fitted with a screw dosage regulator, and the spore suspension, prepared from a two- to three-weeks' old culture on potato dextrose agar, was so calibrated that the quantity ejected ($\frac{1}{74}$ ml.) contained about 100 spores. The tubers were lifted carefully, immediately surface-sterilized in 2 per cent. formalin for $\frac{1}{2}$ min., dried, and kept until required, precautions being taken against chilling. Twenty tubers of each variety were inoculated on two opposite faces, half-way between the two ends, placed in cardboard boxes containing a layer of damp peat, and maintained at an average relative humidity of 94 per cent. and an average temperature of 57° F. After five to six weeks' incubation all tubers were cut through at the inoculation sites and the amount of disease was assessed.

The method gave consistent results and permitted reliable assessments of such factors as varietal susceptibility. Arrested lesions were noted frequently. Suspensions of very high spore concentration or of spores already germinated did not greatly increase the amount of dry rot above that given by the standard inoculum, provided spore germination capacity was 75 per cent. or more. Large tubers were more susceptible than small ones, and the stalk end was more susceptible than the apex. Emphasis is laid upon the necessity for uniformity of material used in these experiments; if the tubers vary in size different layers of tissue may be inoculated. The centre of the tuber was found to be somewhat more susceptible than the cortex.

In the second set of experiments this inoculation technique was used to demonstrate variation in susceptibility to dry rot over an entire storage season, using a number of commercial potato varieties grown at East Craigs and elsewhere in eastern Scotland. It was ascertained that susceptibility is lowest at about normal lifting time in October and gradually increases, though Arran Banner remained very resistant even in May. Different rates of seasonal progress in susceptibility were noted between the different varieties. A very high peak of susceptibility, resulting from physiological or chemical changes in the immature tubers, occurs during the post-flowering period, which in Doon Star is in the second half of August. This is followed by a sudden decrease, which reaches a minimum when the haulm is dead. Differences in susceptibility in different stocks of the same variety were not transmitted to the succeeding crop and may have been due to soil conditions; when samples of these stocks were grown on the same soil no clear differences in susceptibility were detected, though there were variations between comparable samples at certain dates. As marked fluctuation in susceptibility can occur in a few days it would appear that such variations may be due to slight differences in maturation rates between individual plants.

In the third series of experiments tubers of different commercial potato varieties grown in the same soil were inoculated at different periods of the year and over several seasons with the dry rot fungus, the variety Catriona being used as a standard. By a riddle-abrasion method, devised to simulate riddling injury under relatively controlled conditions, surface-sterilized tubers were rubbed with inoculum consisting of 5 lb. sterilized light loam mixed with 500 ml. of a spore suspension containing approximately 300,000 spores per ml., then shaken 50 times on a sterilized 1-in.-mesh hand riddle, stored for three weeks in sterilized sacks, and finally removed to sprouting trays. Final counts were made in April.

No variety tested was immune. Arran Victory, Arran Banner, Great Scot, and Arran Chief were highly resistant, the mean susceptibility index for all experiments (1947–50) being, by the injection method, 16, 13, 20, and 19, respectively, and by the abrasion method 4, 13, 13, and 22, as against 100 by each method for Catriona. A wide difference between the results of the two methods for some varieties, e.g., in Golden Wonder susceptibility was 29 per cent. less by abrasion than by injection, and in Dunbar Standard, 32 per cent. less, is believed to be caused by differences between 'physiological' susceptibility of the tuber flesh and 'mechanical' susceptibility involving liability to abrasion.

A method for assessing skin abrasion was devised. A metal rod 23 cm. long, 4 mm. in diameter, and weighing 23·45 gm., with a 4 mm. ball-bearing soldered to the end was allowed to fall through a measured distance in a glass tube on to a tuber. The distance of fall which just failed to produce an abrasion (counted when moisture appeared on the site) was measured. In each of four tests three blows were struck on each tuber (six of each variety). The resistance to abrasion of Golden Wonder and Dunbar Standard was greater than that of most of the other varieties tested.

The rate of development of rotting was in some cases independent of the final susceptibility index.

Finally the injection method was used in conjunction with the riddle abrasion method at three periods during the storage season to determine the effect of storing Arran Pilot, Catriona, and Home Guard tubers at three temperatures or ranges of temperature upon their subsequent susceptibility to *Fusarium caeruleum*. Low temperature storage (39°) before inoculation, even for only six weeks, decreased susceptibility compared with the normal temperature range of a potato store (34° to 65°) [cf. ibid., 29, p. 112]. If six weeks' storage at 39° immediately followed inoculation, however, and the tubers were then placed for a further six weeks at 60° the amount of rotting was greater than that in tubers kept at 60° throughout.

Foister (C. E.). **The distribution and prevalence of Potato gangrene.**—*Plant Path.*, 1, 3, pp. 85–86, 1 pl., 1952.

Potato gangrene (*Phoma foveata*) [C.M.I. map No. 210] was severe in Scotland in winters following unusually wet weather in two of the three months from August to October in the years 1935 to 1950. The fungus is probably ubiquitous in Scotland, but infection by it or *P. eupyrena* [*R.A.M.*, 25, p. 527] is not always recognized; moreover, injury to tubers in transit promotes gangrene, which is most frequently reported in 'seed' after rail transport. A form of dry rot associated with a species thought to be *P. tuberosa* [ibid., 5, p. 469; 25, p. 526] was reported from Berkshire in 1924, and what may have been the same disease from England on Scotch 'seed' in 1929 and on ware tubers in Lincolnshire in 1930.

Skin necrosis is often a form of gangrene, in which the fungus (*P. foveata* or *P. eupyrena*) penetrates only into the superficial tissues just under the skin. In several instances both gangrene and skin necrosis have been severe in crops grown on land deficient in phosphate, potassium, and nitrogen.

Emilsson (B.) & Gustafsson (N.). **Scab resistance in Potato varieties.**—*Acta Agric. scand.*, 3, 1, pp. 33–52, 2 figs., 1953.

A search for resistance to potato scab (*Actinomyces scabies*) [*R.A.M.*, 26, p. 315] in 47 Swedish and foreign potato varieties was carried out at the Institute for Plant Research and Cold Storage, Nynäshamn, Sweden, from 1946 to 1950 and by the Joint Committee for Potato Research in 1950 and 1951. Varieties were classified in five different resistance groups according to the average percentage infection of tuber surface, the predominant type of scab lesion being classified as superficial, ordinary, deep, or elevated [ibid., 28, p. 639; 32, p. 396]. There were great differences between varieties with regard to the type of scab, those classed as resistant (less than 10 per cent. scab, compared with Up-to-Date taken as 100), Ackersegen, Jubel, and Hindenburg, having exclusively superficial lesions. Statistical analyses indicated these differences to be highly significant and possibly influenced by the place of experiment and year.

Désinfection contre le Rhizoctone noir. [Disinfection against black *Rhizoctonia*.]—*Fruits Prim. Afr. N.*, 22, 242, pp. 508–509, 1952. [Received March, 1953.]

Directions are given for the control of potato black scurf and stem canker (*Corticium solani*) in French North Africa by disinfecting the tubers with organic mercury products [*R.A.M.*, 17, p. 217; 30, p. 68].

Fabricatore (J[olanda] A.). **Solanum tuberosum, ospite casuale di un Heterosporium.** [*Solanum tuberosum*, occasional host of a *Heterosporium*.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 129–131, 3 figs., 1953. [English summary.]

Potato tubers received at the Plant Pathology Station, Rome, bore lesions of a *Heterosporium* sp. usually found on leaves. In mature colonies the hyphae were bright canary yellow and the septate conidiophores, measuring 10·4 to 42 μ, smoky grey. The conidia, hyaline at first, becoming dark olivaceous brown, globose or ovoid when unicellular and cylindrical and constricted at the septum when multicellular, measured 10·5 to 28·6 by 7·8 to 11·7 μ. The fungus was reisolated from spots produced on young inoculated *Gladiolus* leaves.

Research work and workers.—*Seed World*, 72, 5, p. 42, 1953.

As the result of temperature and moisture conditions favourable to spinach white blister [*Cystopus occidentalis*: *R.A.M.*, 32, p. 419] in Texas in 1950 the spinach crop was completely destroyed. Allgold and Goldrush, two high-yielding sweet potato

varieties recently introduced into Mississippi [from Oklahoma], were found to be resistant to stem rot [*Fusarium bulbigenum* var. *batatas*: see next abstract]. Goldrush was also somewhat resistant to soil rot [*Actinomyces ipomoea*: loc. cit.; ibid., 28, p. 539].

Hooker (W. J.) & Peterson (L. E.). **Sulfur soil treatment for control of Sweet Potato soil rot incited by Streptomyces ipomoea.**—*Phytopathology*, 42, 11, pp. 583–591, 3 figs., 2 graphs, 1952.

At the Iowa Agricultural Experiment Station satisfactory control of soil rot of sweet potatoes (*Streptomyces* [*Actinomyces*] *ipomoea*) [see preceding abstract], an important disease in the sandy south-eastern soils of the State, was obtained by applications of sulphur, broadcast at the rate of 800 lb. per acre [*R.A.M.*, 29, p. 81]. Maximum toxicity to the pathogen was secured by treatment with 1,200 lb. per acre, but in some areas this was above the optimum for plant growth.

Stem rot (*Fusarium oxysporum* f. [*F. bulbigenum* var.] *batatas*) [see preceding abstract] did not appear to be influenced by the sulphur applications.

Nielsen (L. W.). **Effect of temperature on the development of internal cork lesions in Sweet Potato roots.**—*Phytopathology*, 42, 11, pp. 625–627, 1 fig., 1 graph, 1952.

At North Carolina State College sweet potato roots infected by the internal cork virus [*R.A.M.*, 32, p. 396] were grown in soils artificially heated from mid-September to early November, at 80° F. in 1950 and 85° in 1951. More necrotic lesions developed in the heated than in the unheated roots (31·8 compared with 10·4 per cent. in 1950 and 62·8 as against 50·3 in 1951). Lesion development is strongly influenced by storage temperature, the necroses increasing in number and expanding at 70°, 85°, and 94°, whereas no additional lesions were formed at 55° though the existing ones appeared to enlarge gradually over a seven-month period.

Tanaka (S.) & Katsuki (F.). **Biochemical studies on the susceptibility of Rice plants to the blast disease. III.**—*J. chem. Soc. Japan*, Pure Chem. Sect., 73, pp. 868–870, 1952. [Abs. in *Chem. Abstr.*, 47, 9, p. 4433, 1953.]

At Kyoto University, Japan, the content of aspartic and glutamic acids was determined in the leaves of various types of rice plants at different stages of growth. Aspartic acid was low at the season of maximum susceptibility to blast [*Piricularia oryzae*: *R.A.M.*, 32, p. 450 and next abstract].

Hashioka (Y.) & Saito (T.). **Phytopharmacology of the Rice diseases. I. In vitro tests on application of the dust fungicides to the important pathogenic fungi.**—*Res. Bull. Coll. Agric. Gifu* 2, pp. 12–18, 1 pl., 1953.

The effects of nine fungicidal dusts and sprays on the hyphal growth of five important pathogens of rice in Japan were tested on agar media by the clear zone method. With aqueous solutions of the fungicides at dilutions of 1 in 1,000 to 1 in 25,000, the reactions of *Cochliobolus* [*Ophiobolus*] *miyabeanus* [see next abstracts], *Piricularia oryzae* [see preceding abstract], *Corticium sasakii*, and *Helminthosporium sigmoideum* [*Leptosphaeria salvinii*] and *H. s.* var. *irregulare* [*R.A.M.*, 26, p. 416] were roughly parallel *inter se*. Growth was inhibited most distinctly by the organic mercury compounds ceresan, uspulun [ibid., 32, p. 276], and neomercron, especially the first-named, except in the case of *C. sasakii*, against which arasan was most effective. Zineb and phygon were intermediate in efficiency, while the copper dust and copper sulphate were almost wholly ineffectual even at the maximum concentration tested. A copper-mercury compound, Sankyo-Bordeaux, exerted a considerable measure of repression.

KITAMURA (E.). **Studies on direct planting in Rice cultivation. I. Influence of soil moisture on the germination of Rice, with special reference to brown spot disease, Ophiobolus miyabeanus.**—*Proc. Crop Sci. Soc. Japan*, 19, 1–2, pp. 104–108, 7 graphs, 1950. [Japanese, with English summary. Received June, 1953].

Studies in Japan demonstrated that the germination of rice seeds infected by brown spot disease (*Ophiobolus miyabeanus*) [*R.A.M.*, 32, p. 449 and preceding and next abstracts] was markedly decreased and seedling growth retarded, particularly when the seeds were sown in comparatively dry soil.

HASHIOKA (Y.). **Varietal resistance of Rice to brown spot and yellow dwarf. (Studies on pathological breeding of Rice, VI.)**—*Jap. J. Breed.*, 2, 1, pp. 14–16, 1952. [Japanese, with English summary.]

In further work in this series [cf. *R.A.M.*, 31, p. 575] seedlings of 253 rice varieties native to different latitudes of Asia were inoculated with *Cochliobolus* [*Ophiobolus*] *miyabeanus* [see preceding abstracts] and then relegated into six grades of infection. In general, the variety-groups belonging to the so-called 'Japonica' (Japanese lowland and upland) and 'Horai' [ibid., 30, p. 190] types were moderately susceptible to resistant and none highly resistant, whereas many of the 'Indica' types, indigenous to Mongolia, the Chinese mainland, Hainan, the Philippines, Indonesia, Indo-China, Malaya, Thailand, Burma, and India, were resistant or highly resistant, only a few being moderately susceptible or susceptible.

Yellow dwarf [rice dwarf virus], transmissible by *Nephotettix bipunctatus* [? *N. apicalis* var.] *cincticeps* [ibid., 17, p. 552], has developed on many Japanese and tropical varieties. Observations on the F_3 populations derived from crosses between resistant and susceptible varieties indicated that resistance to the disease is a heritable character.

GOTO (K.), FUKAZU (R.), & OHATA (K.). **Overwintering of the causal bacteria of Rice leaf blight in the Rice plant and grasses. (Preliminary report.)**—*Agric. & Hort.*, 28, 1, pp. 207–208, 1953. [Japanese.]

Bacterium [*Xanthomonas*] *oryzae* overwinters in diseased rice straw and seeds but probably not in the soil [cf. *R.A.M.*, 31, p. 205]. Primary outbreaks of infection in the field seem to originate from material overwintered in grasses, especially *Leersia oryzoides* var. *japonica*. Isolates from rice plants were pathogenic to *Zizania aquatica*, *Phalaris arundinacea*, *L. oryzoides*, *Phragmites communis*, *Isachne globosa*, and other grasses, while strains of the organism from naturally infected plants of *Z. aquatica* and *L. oryzoides* also attacked rice.

GHOSH (J. J.). **Changes in the phytin-phosphorus content of Rice grains during mould attack.**—*Indian J. Physiol.*, 6, pp. 102–106, 1952. [Abs. in *Chem. Abstr.*, 47, 10, p. 4971, 1953.]

At the University of Calcutta, India, surface-sterilized rice grains of the Bhasamanik, Rupshal, and Patnai varieties (the two former polished and the last-named undermilled), with moisture contents of 11·85, 11·58, and 12·45 per cent., respectively, were inoculated with 12 kinds of moulds, including five species of *Aspergillus* and three of *Penicillium*, and representatives of *Mucor*, *Cladosporium*, and *Alternaria* [*R.A.M.*, 31, p. 305 and cf. next abstract], and the organisms occurring naturally on the grains were allowed to develop in order to determine their effect on the phytin-phosphorus content of the host. After 42 days' storage at 90 per cent. relative humidity mixed (natural) fungal infection resulted in a decrease of the phytin-phosphorus content of 9, 12·5, and 25 per cent., respectively, in the three varieties (in the order named above), the corresponding figures at 100 per cent.

relative humidity being 30, 35, and 50 per cent., respectively. In the inoculated grains the losses of phytin-phosphorus were uniformly higher than in the spontaneously contaminated.

Del Prado (F. A.) & Christensen (C. M.). **Grain storage studies XII. The fungus flora of stored Rice seed.**—*Cereal Chem.*, 29, pp. 456–462, 1952.

The mould counts of samples of 12 rice varieties taken from storage [cf. *R.A.M.*, 32, p. 211 and preceding abstract] in Louisiana and Surinam ranged from 500 to 66,000 per gm., the predominant species in the former locality being *Aspergillus glaucus*, *A. niger*, *Penicillium* sp., and *A. terreus*, and in the latter *Fusarium* sp., *A. niger*, and *Hormodendrum* sp. (in the order named in both cases). *Curvularia* [ibid., 30, p. 539] accounted for 49 per cent. of the isolates from washed hulls in the Louisiana 1950 crop samples. The pericarp of all the grains examined harboured mycelium, and moulds were isolated from the dehulled seeds of every variety. During a 21-day period there was no increase in the mould counts of samples stored in sealed bottles at moisture contents of 14 per cent. or less or at higher levels at 23° and 37° F. At 63° and 75°, however, mould incidence increased with a rising moisture content above 15 per cent. and viability decreased. Various techniques were used to determine mouldiness of seed with varying results. Satisfactory microbiological methods are required for evaluating the quality and storage ability (storability) of the seed.

Saccas (A. M.). **Les principales maladies cryptogamiques de l'Hévéa en A.E.F.** [The principal cryptogamic diseases of *Hevea* in French Equatorial Africa.] —*Agron. trop.*, 8, 2, pp. 176–198, 11 figs., 1953.

In this first instalment of the present work notes are given on the principal diseases of rubber in French Equatorial Africa, arranged alphabetically under the name of the causal organism, with particular reference to their symptoms, cause, and control. The pathogens dealt with comprise *Armillaria mellea* [cf. *R.A.M.*, 30, p. 512]; *Ascochyta heveae* [cf. ibid., 5, p. 324]; *A. heveana* n.sp., characterized by amphigenous, subepidermal, globular, brownish pycnidia 100 to 150 μ in diameter, with a round ostiole, and conidia 4 to 12 by 2 to 3·5 (mean 7 by 2·8) μ, producing leaf spots with concentric, brownish rings corresponding to the distribution of the pycnidia; *Botryodiplodia theobromae* [cf. ibid., 3, p. 509; 31, p. 205]; *Calonectria rigidiuscula* [cf. ibid., 31, p. 206]; *Calostilbe striispora* [cf. ibid., 28, p. 31], found once on dead branches; *Cercospora heveae*, producing irregular, brown leaf spots with a darker margin, sometimes becoming confluent, necrotic, and several cm. in diameter; *Colletotrichum heveae* [? *Glomerella cingulata*: cf. ibid., 32, p. 338]; *Coniothyrium heveae* n.sp. with pycnidia 80 to 100 μ in diameter and conidia 3 to 4·1 by 1·5 to 2 (mean 3·6 by 1·9) μ, producing large, irregular, necrotic leaf spots in association with *Didymosphaeria polyspora* [ibid., 28, p. 589]; and *Corticium salmonicolor* [C.M.I. map No. 122].

For the control of *A. mellea* the removal of infected trees followed by disinfection of the holes with 0·1 per cent. cryptonol at 15 to 20 l. per sq. m. is recommended. Against heavy infections by *Cercospora heveae*, particularly in nurseries, one to three preventive spray treatments with 1 to 2 per cent. copper sulphate, neutralized with lime or sodium carbonate and with the addition of an adhesive and a wetter, are suggested.

A planter's note on the spraying of Rubber trees by the newly invented prototype Drake & Fletcher 'Mistejecta'.—*Plant. Chron.*, 57, 16, pp. 426–428, 1 fig., 1952.

A description is given of the 'Mistejecta' spraying machine, developed by Messrs. Drake & Fletcher Ltd., Maidstone, [Kent], to be used in treatments against *Phytophthora meadii* on rubber [*R.A.M.*, 30, p. 191] in India.

Darley (E. F.) & Silverborg (S. B.). **Black thread of Hevea brasiliensis in Liberia.** —*Phytopathology*, 42, 10, pp. 547–559, 3 figs., 4 graphs, 1952.

A panel disease of *Hevea* rubber, observed in the Harbel district of Liberia in 1940 on some 70 per cent. of the trees of clone T.K. 12 and at first believed to be new, was shown by subsequent studies to be a severe manifestation of black stripe (*Phytophthora palmivora*). At least two strains of the fungus are present, the so-called 'typical' and 'atypical' [*R.A.M.*, 8, p. 526; 32, p. 98], herein designated forms 1 and 2, respectively. The latter is the more virulent of the two, causing the large, patch-like lesions characteristic of infection on T.K. 12, as well as the narrow, vertical streaks ordinarily associated with black stripe and consistently produced by form 1, which was isolated, however, from only three of the 200 panels examined. *Pythium vexans* [cf. ibid., 26, p. 417] was isolated from some of the samples but gave negative results in inoculation experiments on panels. Trees of six clones were inoculated with various isolates of form 2 of *Phytophthora palmivora*, all of which were about equally virulent. Under field conditions some of the clones, e.g., B.D. 5 and B.D. 10 (especially the latter), remained free from black stripe while adjacent trees of T.K. 12 were heavily infected, but the two former may suffer severely in local outbreaks.

Unusual features of black stripe noticed in Liberia included downward spread of infection during dry-season tapping and upward advance into previously renewed and healthy bark, both symptoms developing on trees inoculated with form 2. Infection was milder on panels tapped every fourth day than on those tapped daily or every other day. New bark acquires resistance to infection within four to six days after tapping, and by the eighth day it is immune. The disease is spread to a limited extent only by the tapping knife, being severe on the first trees tapped after infected ones and decreasing rapidly thereafter.

Fungicidal treatment of the tapping cuts offers the best prospects of control. Of the various materials assayed in laboratory and field tests the most effective was socony vacuum product EF 487·2 [cf. ibid., 30, p. 74], applied at least twice a week. Besides giving very good control of the disease it perceptibly stimulated bark renewal.

Skene (J. K. M.). **Trace elements.**—*J. Dep. Agric. Vict.*, 51, 4, pp. 163–168, 6 figs., 1953.

A brief account is given of the trace elements necessary for plant growth [*R.A.M.*, 31, pp. 195, 253], the methods of diagnosing and correcting deficiencies, the occurrence of toxicity, and the availability of these elements in the soil.

Nutman (F. J.) & Roberts (F[lorence] M.). **Acute die-back of Clove trees in the Zanzibar Protectorate.**—*Ann. appl. Biol.*, 39, 4, pp. 599–608, 2 pl., 1952.

The most prevalent form of clove die-back [*R.A.M.*, 32, p. 65] in the Zanzibar Protectorate is that caused by *Cryptosporella eugeniae* n.sp. [loc. cit.]. The first obvious sign of attack is the sudden death of part of a tree; but prior to this pycnidia can be found, their necks protruding from the bark round the point of entry of the fungus, usually a wound sustained at harvest. Perithecia appear later. In damp conditions yellow spore tendrils are extruded and become distributed over the adjacent bark, to which they impart a brownish-orange tinge. In thick bark, where the pycnidial necks do not always reach the surface, the only external signs, seen only under suitable moisture conditions, are tendrils of pycnospores, sometimes 1 cm. long or more, extruded through the cracks.

The general symptoms are similar on trees of all ages, but the effect varies with point of entry. When, as often happens with young saplings, invasion occurs in the lower part of the trunk the whole plant suddenly dies with most of the leaves

adhering to it and drying to a bright russet. A similar effect has sometimes been noted when infection has taken place through the roots. These symptoms are closely similar to those of sudden death [ibid., 3, p. 78; 32, p. 278 *et passim*]. In all trees infection can occur wherever damage has been sustained; the usual site is where a branch has been broken during picking. The distal part of the branch dies suddenly and the fungus grows towards the main trunk, lateral branches on the limb dying successively. Eventually this results in the production of the 'stag-headed' trees with a number of dead limbs, which are such a conspicuous feature of the plantations. The fungus in due course reaches the main trunk. The entire tree may die after trunk girdling, or incomplete girdling may result in almost skeleton trees of no economic value. The infected wood is sharply demarcated from healthy wood by a dark, reddish-brown stain. The mycelium is virtually confined to the stained area, where the vessels are completely occluded by tyloses. All tissues appear to be attacked equally, with copious gum-production, especially in the medullary rays.

Experimental inoculations of trunks, branches, and main lateral roots of mature trees with pure culture mycelium or spore suspensions were made, and after nine months the fungus was found to be growing in all directions from every point of inoculation. Experimental infections reproducing typical symptoms were, however, seldom effective on plants aged 18 to 36 months and never on young seedlings in the two-leaf stage. Failure to cause typical symptoms by inoculation was rare on 7- to 10-year-old saplings.

C. eugeniae has brown pycnidia 0·5 to 0·75 mm. in diameter. The ampulliform sporophores, arising from a labyrinthiform layer, are 8 to 12 by 2 to 3 μ; the ovoid spores 3·4 to 5 by 1·5 μ. The brown perithecia, 500 to 900 μ in diameter, are aggregated two to ten together in sublinear pustules, the asci are without paraphyses, and the ascospores measure 7 to 8 by 3 to 4 μ.

The reason why the disease has reached its present intensity is that for economic reasons the pickers work as rapidly as possible, cutting and breaking the flowering branches and throwing them to the ground to be stripped by other workers. Control should be based on reducing the amount of inoculum (dead trees and branches) and preventing injury, combined with cutting out infected parts of those trees in which the disease is not too far advanced, as the chief sources of inoculum are the lesions on still living trees. Not only does infection in the upper branches give rise to secondary infections lower down the trunk, the spores being water-borne, but insects, birds, and human beings probably also act as carriers. The clothing and person of every picker must be heavily contaminated. The process of cutting out is simplified by the fact that the infected parts display the characteristic stain. Treatment on a plantation scale was applied to one estate, all diseased wood being cut away and the wounds painted with white lead; in no treated tree has the fungus continued to spread, though the disease is progressing in an untreated block. The excision of large lesions, necessitating the removal of more than half the trunk over a distance of several feet, can be safely carried out. A concerted effort for a few years would probably greatly reduce the incidence of the disease. Young, uninfected trees can certainly be protected. If, however, the present harvesting methods are persisted in they will bring the industry to a premature end.

Barat (H.). **Étude sur le dépérissement des Poivrières en Indochine.** [A study on the decline of the Pepper plantings in Indo-China.]—*Arch. Rech. agron. Cambodge, Laos, et Vietnam*, 13, 92 pp., 13 pl., 12 graphs, 2 diags., 1952.

A full account is presented of a serious decline of pepper (*Piper nigrum*) which during the last ten years has killed off two-thirds of the pepper plants in Indo-China [*R.A.M.*, 32, p. 211]. Terminal growth becomes arrested, the foliage loses colour, a few leaves bear patches of anthracnose (due to an as yet unidentified

species of *Gloeosporium*) at their extremity, and later many leaves and fructifications at all stages of development are shed. In some cases a new equilibrium then seems to become established, and the plants appear to recover, at least temporarily. As a rule, however, the branches become disarticulated, one internode at a time, blacken, and fall. The plant dies with the loss of its remaining leaves. Very often only one liane is attacked in each clump; the others may live on for years or may die in a few days.

Defoliation and branch-shedding may often progress as a die-back, the base of the liane bearing an abundance of leaves and fruits. Often, on the other hand, these symptoms start at the base and long remain confined to it; in such cases death often occurs as a form of apoplexy, the whole plant suddenly drying up with the leaves still attached or after they have fallen off while still green. Sometimes defoliation is confined to one part of the plant. Some attacks are so severe that apparently healthy, vigorous plants are killed in 48 hours.

Inoculation tests proved that the *Gloeosporium* was only a secondary organism. The generalized disease of the aerial parts is clearly caused by serious lesions present in the underground parts or trunk. A dying plant in the process of defoliation either has no living roots or only one or two, 1 to 3 mm. in diameter. The underground part of the stem is decayed as far as the collar, at least. The base of the stem sucker is wet with a bacterial rot, and is torn into brownish-black vascular strips. Higher up, part of the wood may remain white and living as long as it is connected with healthy roots. The bark is rotted and black to different depths and the wood yellow with black lines running along some of the fibres. The dead sector often extends to several internodes, and occasionally the aerial stem itself is completely decayed for some distance. Only secondary parasites are present in the affected above-ground parts.

The underground parts of plants which are just beginning to lose their leaves are often in almost as advanced a state of decay as that found in dying plants. They live on during the wet season but die in a few days in the dry one unless watered. If the rot does not pass beyond the collar applications of fresh soil enable it to form weak surface roots and live on.

The disease begins with the destruction of the peripheral root system by the eelworm *Heterodera marioni* and its galls become infected by *Pythium complectens* [*P. vexans*] or *P. splendens*. Secondary parasites such as *Botryodiplodia theobromae* then bring about a spreading decay of the stem. The eelworms by themselves do not cause decay but cause the roots to become susceptible to attack by the two *Pythium* species. A thick dead cover (30 cm. renewed thrice yearly) rapidly arrested eelworm multiplication, and adjustment of soil acidity and soil applications of Bordeaux mixture also gave slight control of the decline.

The reason that attempts to reconstitute plantings have failed is that the young plants develop rot of the deep roots and of the base of the stem suckers caused by *P. splendens* in the presence of excess water. Other rots develop in the bark at the nodes and are associated with insect lesions, becoming the seat of superficial infections, with the result that a rot of the roots growing from the affected nodes sets in. Soil drainage and the control of biting insects would permit preventive control of this condition.

A mosaic-like chlorosis apparently of virus origin is also present [cf. ibid., 30, p. 451], and appears to predispose the plants to foot rot.

Bruehl (G. W.). **Chlorotic streak disease of Pennisetum purpureum.**—*Plant Dis. Reptr*, 37, 1, pp. 34–35, 1953. [Multilithed.]

Chlorotic streak symptoms resembling those on sugar-cane [*R.A.M.*, 31, p. 145] were observed on a plot of *Pennisetum purpureum* amid sugar-cane fields near Central Coloso and at the Puerto Rico Agricultural Experiment Station, Rio

Piedras, in 1952. Fifteen of 63 cuttings of *P. purpureum* not treated with hot water at 52° C. for 20 minutes [ibid., 28, p. 245] developed chlorotic streak while none developed on 65 treated shoots. It is not known whether this virus is the same as the one responsible for sugar-cane chlorotic streak. Hitherto no host other than sugar-cane was known for this disease.

Bates (G.). **A mercurial dipping plant.**—*Cane Gr. quart. Bull.*, 16, 4, pp. 155–157, 1953.

A machine is described for cutting, dipping [against *Ceratostomella paradoxa*], and bagging sugar-cane setts.

Parthasarathy (S. V.), Prakasam (P.), & Krishnamurthy (C. S.). **Green muscardine fungus on Pyrilla sp.**—*Curr. Sci.*, 22, 3, pp. 85–86, 1953.

In studies at the Sugarcane Research Station, Anakapalle, Madras, *Pyrilla* sp. was successfully parasitized by *Metarrhizium anisopliae* [*R.A.M.*, 32, p. 378 and next abstract] in the laboratory and also on sugar-cane in the field when humidity was high. The peak period for the insect at the Station and in the factory zone of South Arcot District was from August to October and for parasitization from September to January when conditions are more favourable to fungus growth.

Mishra (J. N.). **Green muscardine fungus on Sugarcane frog-hoppers in Bihar.**—*Sci. & Cult.*, 18, 11, pp. 547–548, 1953.

Metarrhizium anisopliae was observed on sugar-cane froghoppers (*Pyrilla* sp.) [see preceding abstract] in north Bihar, India, in November and December, 1952, occurring in some localities in an epidemic form and killing many adults and nymphs.

Arnaud (G.). **Mycologie concrète : genera.** [Concrete mycology: genera.]—*Bull. Soc. mycol. Fr.*, 68, 2, pp. 181–223, 8 figs., 1952.

The present paper, part of a projected book on the systematics of fungi which has occupied the author for 12 years and has the proposed title: Traité de Mycologie concrète: Genera [A treatise on concrete mycology: Genera], deals with five genera (one new) of the Phycomycetes and many of the Mucedinaceae. The aim of the book is, particularly, to define generic characters as accurately as possible, and the author considers that the best way of presenting those morphological characters which are the basis of systematics is to give detailed drawings of the important organs. The number of drawings made by the author is so great that eventual publication of the work in book form is doubtful, and the material is therefore to be presented in separate articles, two of which have already appeared. In the present contribution a number of new genera and species are erected [without Latin diagnoses].

Malençon (G.). **Prodrome d'une flore mycologique du Moyen-Atlas. I° Contribution.** [Prodrome of a mycological flora of the Middle Atlas region. First contribution.]—*Bull. Soc. mycol. Fr.*, 68, 3, pp. 297–326, 8 figs., 1952. (Issued 1953.)

This first part of an annotated list of fungi, mainly basidiomycetes, found in the Middle Atlas region of Morocco [cf. *R.A.M.*, 18, p. 550; 30, p. 546; 31, p. 577], includes *Stereum purpureum* on a stump of holm oak (*Quercus ilex*).

Da Costa (Maria E. A. P.) & Da Camara (E. De S.). **Species aliquae mycologicae lusitanicae.** [Some Portuguese mycological species.]—*Portug. acta biol.*, 3, 3–4, pp. 294–307, 1 pl., 1951–1952. [Received May, 1953.]

Among the 54 species in this further contribution to the mycoflora of Portugal

[cf. *R.A.M.*, 31, p. 301] may be mentioned *Macrophyllosticta ulcinjensis* (*Macrophoma ulcinjensis* Bubák) n. comb. on ivy leaves, *Phomopsis neriicola* (*Phoma neriicola* Pat.) n. comb. on oleander foliage, and *Piricularia oryzae* [C.M.I. map No. 51] on rice leaves and culms.

Cooke (W. B.) & Shaw (C. G.). **Western fungi. III.**—*Mycologia*, 44, 6, pp. 795–812, 1952.

In this further contribution to the present series [*R.A.M.*, 32, p. 38] descriptive and technical notes are given on new and interesting members of the Fungi Imperfecti found during routine identifications of fungi collected in Washington and western parts of the United States. Included are *Sphaeropsis vaccinii* n.sp. on *Vaccinium ovatum* at the Cranberry-Blueberry Experiment Station, Long Beach, and *Helminthosporium abietis* n.sp. on *Abies* sp. on Mt. Rose. In the summer of 1950 during seed germination tests, *Memnoniella echinata* (the most northerly record of the fungus), *Delitschia bisporula*, *Chaetomium funicola*, *C. convolutum*, and *Alternaria tenuissima* were detected on *Tragopogon* spp.; *A. tenuis*, *Cladosporium herbarum*, *Penicillium expansum*, *H. cyclops* (the imperfect state of *Pleosphaeria semeniperda*), and *Stachybotrys atra* were noted on both *T.* spp. and *Bromus* spp. Mould development was more profuse on the former than on the latter, but was serious only when conditions were unfavourable for germination. Most *Bromus* seeds remained free from mould for at least one month unless kept in very moist conditions.

Petrak (F.). **Ergebnisse einer Revision der Grundtypen verschiedener Gattungen der Askomyzeten und Fungi imperfecti. III.** [Results of a revision of the basic types of various genera of the Ascomycetes and Fungi Imperfecti. III.]—*Sydowia*, Ser. II, 6, 5–6, pp. 336–343, 1952.

In this further instalment of the present series [cf. *R.A.M.*, 31, p. 353] ten more genera are submitted to a critical examination.

Petrak (F.). **Zwei neue Gattungen der Parasphaeropsideen.** [Two new genera of the Parasphaeropsideae.]—*Sydowia*, Ser. II, 6, 5–6, pp. 372–377, 1 fig., 1952.

Latin and German diagnoses are given of *Robakia* n.gen., with its type species *R. arctica* n.sp. on desiccated spruce branches in Norway, and *Dichaeropsella* n.gen., represented by *D. quernea* n.sp. on living oak branches in Florida.

Petrak (F.) & Deighton (F. C.). **Beiträge zur Pilzflora von Sierra Leone.** [Contributions to the fungus flora of Sierra Leone.]—*Sydowia*, Ser. II, 6, 5–6, pp. 309–322, 1 fig., 1952.

This critically annotated list of fungi in Sierra Leone comprises 16 new species, including *Leptosphaeria penniseticola* on *Pennisetum purpureum*.

Tullis (E. C.) & Johnson (A. G.). **Synonymy of Tilletia horrida and Neovossia barclayana.**—*Mycologia*, 44, 6, pp. 773–788, 1 fig., 1952.

After briefly reviewing the literature on the germination of the chlamydospores of *Neovossia horrida* [cf. *R.A.M.*, 27, pp. 411, 468] and *N. barclayana* [cf. ibid., 10, p. 450] and describing their own researches on the subject, the authors give an emended description of the genus *Neovossia* to include species with fragmentary appendages or almost none. The nomenclature, synonymy, description, host range, and type locality of *N. barclayana* are detailed. The chlamydospore measurements differed by 2 to 3 μ on rice, and 6 to 8 μ on *Pennisetum* spp. The synonyms include *N. horrida* and *T. pennisetina* [cf. ibid., 31, p. 147].

Pinto-Lopes (J.). **'Polyporaceae'. Contribuacão para a sua biotaxonomia.** [Polyporaceae. Contribution to their bio-taxonomy.]—*Mem. Soc. broteriana*, 8, pp. 5–191, 29 pl., 1952. [French, English, and German summaries.]

A study at the Botanical Institute, University of Coimbra, Portugal, of the ontogeny and comparative anatomy of about 90 typical European members of the Polyporaceae [cf. *R.A.M.*, 31, pp. 92, 509], supplemented by a survey of the literature (listed in a 12-page bibliography), led to the adoption and redefinition of the terms 'primary', 'secondary', and 'tertiary' mycelium for the successive stages of mycelial development. Of primary importance in the taxonomy of the group are the characters of the secondary and tertiary hyphae (especially the former), since they permit a division of the family into subfamilies. Less significant, but of some value in the division of the subfamilies into genera, are the nature of the surface of the hymenophore and the consistency of the trama.

It is considered that no taxonomic value attaches to the shape of the hymenophore, the configuration of the hymenial surface, the length of the tubes, the annual or perennial nature of the hymenophores, the colour and shape of the spores, the form of the basidia, the presence or absence of cystidia and setae, branched clamps, 'médaillons', plasmatic septa, or rings. Based on these principles, a new method of classification of the Polyporaceae is outlined.

Damon (S. C.). **Notes on the hyphomycetous genera, Spegazzinia Sacc. and Isthmospora Stevens.**—*Bull. Torrey bot. Cl.*, 80, 3, pp. 155–165, 2 figs., 1953.

This review of the genus *Spegazzinia*, made as far as possible from type material, indicates that it may include species having four-celled spores which are either smooth-walled or echinulate and are borne terminally on simple conidiophores arranged in sporodochia. Therefore *Spegazzinia* is distinguished from *Tetracoccosporium*, which lacks sporodochia, and from *Isthmospora* in the morphology of its spores. The author considers there is only one good species of *Spegazzinia* and one of *Isthmospora*, namely *S. tessarthra* and *I. trichophila* n.comb. (syn. *S. trichophila*).

The control of Armillaria root disease in Tea.—*Plant Chron.*, 57, 21, pp. 571–574, 1952.

In this reprint of a paper written by T. Eden, Tea Research Institute, East Africa, the symptoms and control of *Armillaria mellea* on tea [cf. *R.A.M.*, 28, p. 200; 29, p. 89] are described.

Laoh (J. P.). **Een beschouwing over de technische moelijkheden en economische aspecten van koperstuifpoeders met inheemse draagstoffen bij de bestrijding der blisterblight.** [A survey of the technical possibilities and economic aspects of copper dusts with home-produced fillers in the control of blister blight.]—*Arch. Theecult., 1952*, 1, pp. 35–67, 5 graphs, 1952. [English summary.]

This is an amplified version of the author's survey of the technical and economic aspects of the control of tea blister blight (*Exobasidium vexans*) in Java [see next abstracts] with copper dusts, the principal results of which have already been presented from another source [*R.A.M.*, 32, p. 150]. Although knapsack spraying is cheaper than dusting, great difficulties are experienced in organizing spraying teams and sufficient control is frequently unobtainable. Many estates, therefore, are compelled to adopt the less economic motor dusting. The cost of the very effective volcanic tuff filler used with copper oxychloride is only about 25 cents per kg. The motor duster used in the experiments was the Whirlwind [ibid., 32, p. 454 and next abstract].

Homburg (K.). **Voorlopige mededeelingen over de natte en droge blister-blight-bestrijding op Sperata/Sinumbra.** [Preliminary notes on wet and dry blister blight control on Sperata-Sinumbra.]—*Bergcultures*, 22, 2, pp. 31, 33, 35, 37, 39, 1953.

Particulars are given of the apparatus and methods used in the spraying and dusting of tea bushes for the control of blister blight [*Exobasidium vexans*] on an Indonesian estate [see preceding abstract], together with some information on labour requirements, cost of the various ingredients, water transport, upkeep of machinery, and so on.

Reitsma (J.). **Een jaar blisterblight op Java.** [A year of blister blight in Java.]—*Arch. Theecult., 1952*, 1, pp. 5–33, 21 figs., 1952.

This is a survey of the progress achieved in the control of blister blight (*Exobasidium vexans*) of tea in Java by spraying and cultural methods during 1951–2 [cf. *R.A.M.*, 31, p. 210, preceding and next abstracts, *et passim*].

Van der Knaap (W. P.). **Blisterblight-resistentie van Theeheesters en Theeclonen.** [Blister blight resistance of Tea bushes and Tea clones.]—*Arch. Theecult., 1952*, 1, pp. 69–98, 4 figs., 1 graph, 1952. [English summary.]

As a result of studies in Java it is proposed that in the immediate future new mother tea bushes shall be selected in the first place for resistance to blister blight (*Exobasidium vexans*) [*R.A.M.*, 32, p. 454 and preceding and next abstracts], the consideration of other desirable characters being reserved for clone trials. Selection will be made from healthy or only slightly infected bushes in severely diseased gardens. Two months before the next wet season the bushes will be pruned and the cut material used for the establishment of a reproduction garden. During the wet season (when heavy infection is to be expected) the bushes will not be sprayed and the incidence of infection will be assessed, since there is little difference in this respect between resistant and susceptible clones during the dry season.

Older clones, selected on a productivity basis, range from very susceptible, e.g., Mal 15, PS 324, Skdj. 118, SA 12, Mal 2, and PS 125, to highly resistant, represented by PS 1, PS 207, GP 7, Tjinj. 22, Mal 13, and KP 4. No close correlation could be established between yield and (*a*) susceptibility to *E. vexans* or (*b*) quality, but within the different clones there was a definite connexion between yield and rate of infection, which may depend in part on the tannin content of the leaves.

De Geus (J. G.). **Blisterblightbestrijding bij, en enkele meer algemene bijzonderheden over de Theecultuur op Ceylon en in India.** [Blister blight control, and some more general details concerning Tea cultivation in Ceylon and India.]—*Arch. Theecult., 1952*, 1, pp. 99–113, 6 figs., 1952.

The indirect and direct measures applied for the control of blister blight (*Exobasidium vexans*) of tea [see preceding abstracts] in Ceylon [*R.A.M.*, 32, p. 454] and India [ibid., 32, p. 282] are described from the author's observations on a visit to the two countries in 1951.

Jeener (R.) & Lemoine (P.). **Occurrence in plants infected with Tobacco mosaic virus of a crystallizable antigen devoid of ribonucleic acid.**—*Nature, Lond.*, 171, 4360, pp. 935–936, 1 graph, 1953.

At the Laboratory of Animal Physiology, University of Brussels, a non-infective protein fraction containing no detectable ribonucleic acid was isolated by high-speed centrifugation of an extract from tobacco leaves infected with tobacco mosaic virus [cf. *R.A.M.*, 26, p. 267; 28, pp. 261, 297; 32, p. 346]. The fraction was

crystallized at pH 3·8 as needles identical with those of the virus, the amount isolated being equal to $\frac{1}{16}$th to $\frac{1}{20}$th of the infective virus. It was precipitated by the antibody of an anti-serum obtained by injection of tobacco mosaic virus, but the precipitate was finely granular instead of flocculent.

Nichols (C. W.). **The retarding effect of certain plant hormones on Tobacco mosaic symptoms.**—*Phytopathology*, 42, 11, pp. 579–580, 1952.

At the Department of Plant Pathology, University of California, Berkeley, the application to young tobacco plants in the greenhouse of naphthalene acetic or indolebutyric acid solutions retarded the development and mitigated the severity of tobacco mosaic virus symptoms [*R.A.M.*, 28, p. 35; 31, p. 221; 32, p. 363]. The latter acid did not cause stunting of the plants, as did the former. The best results were secured by daily treatments with 100 mg. per l. or at five- to nine-day intervals with 500 mg. No concentration of either compound entirely prevented mosaic symptom development without damage to the host.

Mercer (F. L.), Lindhorst (T. E.), & Commoner (B.). **Inhibition of Tobacco mosaic virus biosynthesis by 2-thiopyrimidines.**—*Science*, 117, 3047, pp. 558–559, 1953.

After referring to the inhibition of tobacco mosaic virus (TMV) formation in tobacco leaf tissues by thiouracil [*R.A.M.*, 30, p. 547], the authors describe the results of studies on purine and pyrimidine derivatives. Tobacco leaf disks inoculated with purified TMV were cultured in nutrient to which the inhibitor was added. At the time when untreated inoculated tissue contained a maximum amount of TMV (260 hours after inoculation) the percentage inhibition was 90 to 100 for 2-thiouracil (10^{-4}), 2-thiocystine (10^{-4}), and 2-thiothymine (10^{-3}), 80 for 2, 6 diamino purine (10^{-4}) and 60 for 8-azaguanine [see next abstract] (10^{-4}). Inhibitory effectiveness appears to be a common characteristic of the 2-thiopyrimidines, though 2-thiothymine is less active than the uracil and cytosine derivatives. The results with 8-azaguanine confirm Matthews' observation [ibid., 30, p. 447]. Of the natural nitrogen bases used (uracil, cytosine, and thymine) only uracil was able to suppress the inhibition caused by the thiopyrimidines. These results confirm the view that synthesis of the virus is uracil-dependent.

Matthews (R. E. F.). **Incorporation of 8-azaguanine into nucleic acid of Tobacco mosaic virus.**—*Nature, Lond.*, 171, 4363, pp. 1065–1066, 1953.

The results of experiments at the Molteno Institute, Cambridge, showed that 8-azaguanine (guanazolo) [*R.A.M.*, 31, p. 318 and preceding abstract], at a concentration of 0·01M in 0·1 per cent. sodium bicarbonate, sprayed on the leaves of tobacco plants infected with tobacco mosaic virus, becomes incorporated into the virus nucleic acid.

Hirth (L.) & Drouhet (E.). **Inhibition du virus de la mosaïque du Tabac par le polyoside capsulaire de Torulopsis neoformans.** [Inhibition of the Tobacco mosaic virus by the capsular polyose of *Torulopsis neoformans*.]—*Ann. Inst. Pasteur*, 84, 2, pp. 437–440, 1953.

In inoculation experiments at the Institut Pasteur, Paris, with tobacco mosaic virus on half leaves of *Nicotiana glutinosa*, the polyose of *Torulopsis* [*Cryptococcus*] *neoformans* at 5 per mille exerted a much more powerful inhibitory effect [cf. *R.A.M.*, 32, p. 152] on lesion development than did starch, inulin, or glycogen. The polyose contains xylose and mannose linked with a uronic acid.

Tirelli (M.). **Malattie e parassiti del Tabacco non ancora introdotti in Italia.** [Diseases and parasites of Tobacco not yet introduced into Italy.] —*Tabacco, Roma*, 56, 638–639, pp. 263–308, 17 figs., 1952.

Notes are given on the symptoms, causes, effects, geographical distribution, host plants, and control of the principal fungal, bacterial, virus, and insect-caused diseases of tobacco not yet found in Italy.

Gigante (R.). **Malattie infettive delle piantine di Tabacco nei semenzai del Leccese.** [Infectious diseases of Tobacco seedlings in the seed-beds of Lecce.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 93–109, 11 figs., 1953.

This account of wildfire (*Pseudomonas tabacum*) and ring spot virus attacking tobacco seedlings in Italy during 1950 has already been noticed from another source [*R.A.M.*, 31, p. 90].

Huter (R.) & Savary (A.). **La pourriture des racines du Tabac.** [Root rot of Tobacco.]—*Rev. romande Agric.*, 9, 5, pp. 39–41, 3 figs., 1953.

In French-speaking Switzerland and the canton of Ticino the only economically practicable method of controlling tobacco root rot, caused by *Thielaviopsis basicola* and the eelworm *Pratylenchus pratensis*, is by steam sterilization of the beds [*R.A.M.*, 32, p. 402]. Use should be made of the Mont-Calme Jaune Résistant variety, which will enable tobacco to be grown in areas where the disease seemed likely to cause the abandonment of the crop. A new White Burley variety which appears to be particularly well adapted to the local climatic conditions is to be planted on a large scale.

Chiba (Y.) & Tominaga (Y.). **Cytochemical studies on chloroplasts. II. Inhibitory effects of chloroplast-suspensions upon the infectivity of Tobacco mosaic virus.** —*Enzymologia*, 15, 5, pp. 267–274, 1 graph, 1952. [German summary.]

At the Biological Institute, Kyushu University, Fukuoka, Japan, expressed sap from *Nicotiana glutinosa*, tobacco, spinach, chilli, and cabbage leaves was separated by centrifugation into chloroplasts and cytoplasmic residue and each tested for inhibitory effect on tobacco mosaic virus [cf. *R.A.M.*, 5, p. 377; 27, p. 58; 31, p. 403]. Chloroplast suspensions in glucose solution consistently exerted a preventive action on virus development in leaves of *N. glutinosa*, but cytoplasmic suspensions (i.e., supernatant fluids passed through a Seitz filter) failed to do so except in the case of chilli. However, the inhibitory substances residing in the chloroplast and in the cytoplasmic suspensions from this host appear to differ in their physico-chemical properties, since the former were inactivated by ten minutes' exposure to a temperature of 90° C., at which the latter persisted unchanged. The activity of the chloroplasts was weakened at the extreme pH values of 5 and 8 and reached a climax at a temperature range of 35° to 45°, from which it would appear that the inhibitory substances are of a protein nature.

Roll-Hansen (J.). **Damping av jord til Tomat.** [Steaming of soil for Tomatoes.]—*Forskn. Fors. Landbr., 1952*, pp. 229–259, 6 figs., 1952. [English summary.]

At the Kvithamar Experiment Station, Stjördal, Norway, steam sterilization of greenhouse soil is important mainly in the control of tomato diseases, of which the most troublesome is brown root rot [*R.A.M.*, 31, p. 222]. Various fungi have been reported in connexion with this disease, the most prevalent at Kvithamar being *Cylindrocarpon radicicola* [loc. cit.]. It appears, however, from the available evidence that fungal damage is secondary to some other cause not yet elucidated. Brown root rot may be effectively combated by steam sterilization or treatment of the soil with chloropicrin. Stringent precautions should be taken to avoid recontamination of the soil with infested implements and the like.

Davis (D.) & Dimond (A. E.). **Altering resistance to disease with synthetic organic chemicals.**—*Phytopathology*, 42, 10, pp. 563–567, 1952.

Much of this information on the chemotherapeutic activity of various compounds against *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici* on tomato [*R.A.M.*, 32, p. 137] and their toxicity to the fungus has already been noticed from another source [ibid., 31, p. 392]. The fungus grew equally well on the tissue macerate of Bonny Best plants treated with 1182 (4-chloro-3,5-dimethyl phenoxyethanol) or HD 160 (2-carboxymethylmercaptobenzothiazole) and untreated. Both compounds, however, induced leaf modifications and increased the concentration of the water-soluble nitrogen fractions in the plants.

The enhanced resistance to *F. bulbigenum* var. *lycopersici* conferred on tomato by 1182 and HD 160 is tentatively attributed to their influence on the metabolism of the plants.

Waggoner (P. E.) & Dimond (A. E.). **Examination of the possibility of therapy of plant disease with ionizing radiation.**—*Phytopathology*, 42, 11, pp. 599–602, 1952.

At the Connecticut Agricultural Experiment Station the supposition that *Fusarium* wilt of tomato (*F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici*) [see preceding abstract] would not prove amenable to therapy by ionizing radiation [*R.A.M.*, 32, p. 237] was verified by tests with gamma radiation from Co^{60}. Measurements of radiophosphate distribution showed that the amount of radioactivity reaching the growing point was little less in diseased than in healthy plants. The cure of wilt by internal sources of radiation is therefore considered to be improbable.

Stems that had become necrotic from the effects of the pathogen no longer translocated appreciable quantities of phosphate to the leaves and growing point, but mere discoloration did not noticeably interfere with the translocation process.

Brian (P. W.), Elson (G. W.), Hemming (H. G.), & Wright (Joyce M.). **The phytotoxic properties of alternaric acid in relation to the etiology of plant diseases caused by Alternaria solani (Ell. & Mart.) Jones & Grout.**—*Ann. appl. Biol.*, 39, 3, pp. 308–321, 1 pl., 7 graphs, 1952.

Experiments at the Butterwick Research Laboratories, Welwyn, Herts., demonstrated that when alternaric acid [*R.A.M.*, 31, p. 305; 32, p. 140] is introduced into the vascular system of cut shoots of tomato or potato it passes upwards and causes necrotic lesions of the stem, petioles, and leaf blades resembling those which develop in some phases of natural attack by *Alternaria solani* [cf. ibid., 32, p. 404]. A disturbance of the water balance is associated with lesion formation, increased transpiration bringing about complete desiccation of the shoots. A strain of the fungus known to produce alternaric acid in synthetic culture media also produces a substance with similar biological properties when inoculated into tomato fruits. As some symptoms of *A. solani* attack are known to be toxigenically induced, the toxin concerned may be alternaric acid. On the other hand, there is no correlation between the virulence of different strains of *A. solani* and their ability to synthesize the acid, some very virulent strains producing little or none under all conditions tested. Some evidence was obtained that other toxins are produced by *A. solani*.

Ciccarone (A.). **Note fitopatologiche I. Importanza di un 'marciume basale' del frutto del Pomodoro in alcune aree campane.** [Phytopathological notes I. Economic importance of a basal rot of Tomato fruits in some areas of Campania.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 57–60, 1 fig., 1953. [English summary.]

This information concerning basal rotting of tomato fruits in Italy by *Alternaria*

solani and *A.* spp. of the *tenuis* type has already been noticed from another source [*R.A.M.*, 31, p. 521].

ABERDEEN (J. E. C.). **Investigations on the phytotoxicity of Bordeaux mixture to Tomatoes.**—*Qd J. agric. Sci.*, 9, 1, pp. 1–40, 1 diag., 8 graphs, 1952.

A series of experiments on the phytotoxicity of Bordeaux mixture to tomatoes [cf. *R.A.M.*, 28, p. 146] carried out at the Science Branch, Division of Plant Industry, Queensland, showed that it was more toxic (as estimated by total fruit yield, total vegetative growth, and growth rate) at 4–4–40 concentration than at 4–2–40 and more toxic than other, various 'inert' copper compounds. The lime content of Bordeaux mixture was found to be an important factor. Phytotoxicity was further influenced by cultural conditions and the vigour of the plants at the time of spraying. Under certain circumstances Bordeaux mixture stimulated tomatoes. This was regarded as a response to copper of plants growing on copper-deficient soils. Sometimes it had an adverse effect on transpiration, photosynthesis, and translocation, thus impairing flower setting.

MCCALLUM (D. W.). **Soil sterilisation with chloropicrin.**—*N.Z. J. Agric.*, 86, 3, pp. 237, 239–240, 6 figs., 1953.

An account is given of chloropicrin [*R.A.M.*, 32, p. 36] and its mode of application by injection in soil sterilization trials in tomato glass-houses at the Department of Agriculture, Blenheim, New Zealand. To obtain good results it is best to ensure that the soil temperature is not less than 65° F., that the soil is completely cleared of all residue from the previous year's crop, and that injections are from 6 to 8 in. deep and the ventilators are open. The house should then be closed for at least three days. Great care should be taken to prevent reinfection by workers.

RAYCHAUDHURI (S. P.). **Studies on internal browning of Tomato.**—*Phytopathology*, 42, 11, pp. 591–595, 1 fig., 1952.

At the Rockefeller Institute for Medical Research, New York, internal browning of tomato could not be reproduced in tomato fruits by grafting healthy scions on to diseased stocks. The slightly atypical strain of tobacco mosaic virus associated with internal browning of tomato in New Jersey was retained in tomato seeds for only one to two weeks, as compared with 27 to 28 days for the ordinary strain [*R.A.M.*, 31, p. 520]. Extracts of germinating seeds of Rutgers, Valiant, and Bonny Best tomatoes appreciably reduced the infectivity of tobacco mosaic virus in inoculation tests on half leaves of *Nicotiana glutinosa*.

Annual Report of the Forest, Insect, and Disease Survey, Canada Department of Agriculture, 1952.—154 pp., 23 maps, 1953.

In the section (pp. 18–21) of this report dealing with the forest disease survey of 1951–2 in the Maritime Provinces, Canada, M. A. STILLWELL states that fructifications of *Adelopus balsamicola* [*Phaeocryptopus nudus*: *R.A.M.*, 17, p. 638; 26, p. 568; 28, p. 97] were present on dead hanging needles of young balsam fir [*Abies balsamea*] in widely separated localities. A survey in the autumn of 1951 revealed no evidence that Dutch elm disease (*Ceratostomella ulmi*) [cf. ibid., 31, p. 523] had been introduced. Of wind-thrown balsam fir trees examined in Newfoundland 98 per cent. contained a brownish or occasionally yellowish discoloration, from which *Stereum chailletii* [ibid., 31, p. 413] was most commonly isolated, with, occasionally, *S. sanguinolentum* [loc. cit.]. Brown cubical sap rot associated with *Lenzites sepiaria* [cf. ibid., 31, p. 637] was the most common type of advanced deterioration. In 242 yellow birch [*Betula lutea*] trees examined in 1951 *Armillaria mellea* [ibid.,

25, p. 372] was the most common cause of butt rot and *Fomes igniarius* [cf. ibid., 27, p. 502] that of top rot; *F. fomentarius* [cf. ibid., 22, p. 184] was the most frequent destroyer of the sapwood. In the *Ribes* eradication campaign 30 per cent. of the bushes removed were infected by white pine blister rust (*Cronartium ribicola*) [ibid., 31, p. 51; 32, p. 461, and below, p. 525].

From Quebec R. POMERLEAU reports (pp. 35–39) that except for small extensions on the outskirts of the area of infection known in 1949, Dutch elm disease [ibid., 30, p. 635] has not invaded new territory during the past few years. The pattern of the outbreak indicates that spread was rapid in flat lands along the St. Lawrence River. A fair idea of the severity of the disease can be obtained from six sample plots, each of 1 sq. mile, established in 1946 and 1947 near the centre of the infected area. Spread is somewhat slow in these plots and in the buffer zones as the trees are isolated or scattered along fences and roads, but it is much more rapid along streams and in villages, where density of the elm population is greater.

Young balsam fir trees, mostly round the city of Quebec, were attacked by needle cast (*Bifusella faullii*) [ibid., 12, p. 255]. Willow [*Salix*] blight (*Fusicladium saliciperdum* [*Venturia chlorospora*] and *Physalospora miyabeana*) [ibid., 21, p. 544] was prevalent and quite injurious in the lower St. Lawrence region, and was also reported from two stations in western Quebec.

D. A. QUIRKE (pp. 67–78), dealing with the 1952 survey in Ontario, states that white pine blister rust has made marked progress on white pine in the Haliburton area in the past decade. In 16 plots, each with an average of 352 trees per acre, there was at the beginning of the period less than one tree per acre killed by the rust, though 58 per acre were infected. In 1952 8·6 per cent. of the medium-sized and larger trees and some of the smaller ones had been killed, while the number infected had risen to 71 per acre. In regeneration stands in the Madawaska and Petawawa watersheds, of 10,308 trees up to 26 feet in height 2·3 per cent. were infected, 2·2 per cent. being dead. In a stand of 342 living trees in Algonquin Park with little, if any, infection in the middle 1930's and free of *Ribes*, 7 per cent. were infected and 2 per cent. had been killed. In southern Ontario there has been an increase of 23 per cent. in the incidence of the disease during 1952.

Samples of 1,629 balsam fir trees killed by budworm [*Harmologa fumiferana*] near Algonquin Park, North Bay, and Lake Nipigon, Ontario [ibid., 31, p. 413] included 69·2 per cent. with symptoms of decay. The four main types of rots were trunk rots, white stringy butt rots, brown cubical butt rots, and red butt rots, and these accounted for 33·8, 46·6, 9·3, and 3·7 per cent., respectively, of the samples. Trunk rot was responsible for two to three times the volume of culled wood that butt rots caused. *S. sanguinolentum* caused most of the trunk rot. The fungi most frequently associated with white stringy butt rots were *Corticium galactinum* [ibid., 31, p. 51], *Odontia bicolor* [cf. ibid., 28, p. 348], *Poria subacida* [cf. ibid., 31, p. 215], *A. mellea* [ibid., 31, p. 51], and *Omphalia campanella* [cf. ibid., 26, p. 272]; of these, *C. galactinum* was much the most prevalent. The fungi most frequently associated with brown cubical butt rots were *Coniophora puteana* [ibid., 31, p. 413] and *Polyporus balsameus* [cf. ibid., 28, p. 596], *Merulius himantioides* [cf. ibid., 31, p. 154] being much less important. *S. sanguinolentum* and *Corticium galactinum* were most frequently associated with red butt rots.

Twelve wood-destroying fungi were associated with heartwood decay of 604 living *Populus tremuloides* trees felled and sectioned in the Manitoulin area, Ontario. By far the most important was *Fomes igniarius* var. *populinus* [ibid., 32, p. 348], which caused most of the trunk rot and 71·4 per cent. of the total volume of decayed wood. *Radulum casearium* also caused much decay. Two imperfect fungi were associated with a light brown mottled rot and a light brown stain in the trunks of 9·6 per cent. of the decayed trees. Of the remaining six fungi isolated from trunk rots, the chief were *Trechispora raduloides* [cf. ibid., 28, p. 32], *C.*

polygonium, and *Pleurotus subareolatus*, responsible, respectively, for 1·4, 0·8, and 0·4 per cent. of the total volume of decay. From butt rots in 2·4 per cent. of the decayed trees *A. mellea* and *Pholiota adiposa* [ibid., 31, p. 51] accounted for 0·5 and 0·3 per cent., respectively, of the total volume of decayed wood.

The most frequently encountered organisms causing sap rots and heart rots of red, white, and jack pine [*Pinus resinosa*, *P. strobus*, and *P. banksiana*, respectively] killed by fire in 1948 were *F. pinicola* [ibid., 31, p. 413], *Peniophora gigantea* [cf. ibid., 31, p. 154], *Coniophora puteana*, and *L. sepiaria*, associated with brown cubical rots; *Polyporus anceps* [cf. ibid., 23, p. 51] and *S. pini* [cf. ibid., 13, p. 810], associated with white stringy rots; and *Poria monticola* [cf. ibid., 31, p. 154], associated with brown cubical sap stain. Of these, *F. pinicola* was the most prevalent, followed by *Peniophora gigantea*, and then by *Polyporus anceps*.

During the peak growing season in 1952, 13·7 per cent. of 16,672 red pine seedlings at Orono Nursery died as a result of attack by damping-off fungi [ibid., 31, p. 412], the most prevalent being *Fusarium scirpi* var. *acuminatum* and a mixture of *Rhizoctonia* [*Corticium*] *solani* and *F. oxysporum* isolated from 82 and 13 per cent. of the samples, respectively.

In work designed to provide a proper basis for inventory and management of spruce-balsam forests in the Lake Nipigon area by the assessment of decay losses 658 trees on 20 $\frac{1}{10}$-acre plots were examined for decay and the organisms responsible. The fungi so far identified include *Fomes pini*, the chief cause of red heart rot; an organism tentatively identified as *S. pini* on jack pine; *Odontia bicolor* on balsam fir; *P. circinatus*, and another organism, tentatively identified as *C. galactinum* on black spruce [*Picea mariana*] and white spruce [*P. glauca*]; *F. igniarius* on birch, causing white or yellow stringy rot; *F. i.* var. *populinus* and *Radulum casearium* on *Populus tremuloides*, causing yellow mottled rot and brown or yellow stringy rot; and *S. sanguinolentum* on balsam fir, causing brown cubical rot.

Two records of Dutch elm disease were received from Middlesex county, where it had not previously been recorded. *Polyporus obtusus* [cf. ibid., 27, p. 266] was collected on elm, this being the only known record of the fungus on elm.

R. W. Thomas reports on the 1952 survey in Manitoba and Saskatchewan (pp. 92–99). At Reserve the most prevalent root rots of white spruce were *P. circinatus* var. *dualis* and *A. mellea*. Dead and dying white spruce at Candle Lake were heavily infected by root rot caused by the two foregoing and *Coniophora puteana*. Spruce was heavily attacked by rust (*Peridermium coloradense*) [cf. ibid., 18, p. 643] in the vicinity of the Pas and Riding Mountain National Park, Manitoba. Needle rust (*Chrysomyxa ledicola*) [ibid., 29, p. 81] is generally distributed in both provinces. Observations on *Wallrothiella arceuthobii* on jack pine mistletoe (*Arceuthobium americanum*) indicated that it may be more important for biological control than was formerly realized. The fungus occurs in jack pine stands on dry sites and appears appreciably to restrict the development of mistletoe seeds in some parts of the Prince Albert region.

From a preliminary study of a reddening of balsam fir, root rot organisms appeared to be primarily responsible; in certain areas *Armillaria mellea* was present in a high percentage of cases. A white trunk rot of poplars due to *Corticium polygonium* was very prevalent in young stands. In older stands white trunk rots caused by *R. casearium* and *F. igniarius* were the most prevalent forms of rot causing loss in the trunk. Brown flaky rot of poplars caused by *Pholiota spectabilis* [ibid., 31, p. 51] and white stringy rot due to *A. mellea* were responsible for most of the basal loss. Heavy infection of poplar by canker (*Hypoxylon pruinatum*) [cf. ibid., 32, p. 222] occurred in the Madge Lake area of the Duck Mountain Forest Reserve, Kamsack, Saskatchewan. Random strip scouting indicated an average infection of approximately 10 per cent. of poplar between the ages of 30 and 70 years.

R. J. Bourchier dealing with the Alberta and Rocky Mountain National Parks (pp. 121–126) reports that a leaf spot of *Populus tremuloides* associated with *Marssonina tremuloidis* reached epidemic proportions in the Canmore-Banff area in 1952. It was first noticed towards the end of August, when the entire crowns of affected trees displayed a bronzed discoloration and the leaves fell prematurely. A witches' broom type of malformation, caused by *Peridermium coloradense*, is widespread in Alberta on black spruce, white spruce, and Engelmann spruce [*Picea engelmanni*].

In the reports from British Columbia (pp. 142–154) W. G. Ziller and A. C. Molnar observe that locally *F. pini* and *Polyporus schweinitzii* [ibid., 28, p. 429] together caused 89 per cent. of the total volume of decay in living, mature Douglas fir (*Pseudotsuga taxifolia*). In dead trees *F. pinicola* and *Polyporus* [*Polystictus*] *abietinus* [ibid., 31, pp. 51, 413] caused far more loss than any other fungi, the former producing heart and sap rots, the latter mainly a sap rot.

In the forests of the north coast and the south central interior *Echinodontium tinctorium* [ibid., 28, p. 430] causes severe losses to balsam fir. In 1952 some 32 localities were sampled and *E. tinctorium* was found to be common on fir in three localities and abundant on western hemlock (*Tsuga heterophylla*) in eight. Decay losses in 833 western hemlock trees in the Upper Columbia region (Kamloops Forest District) amounted to 52 and 74 per cent. in terms of cubic and board feet, respectively. *E. tinctorium* and *F. pini* contributed over 85 per cent. of the total decay. Exceptionally heavy browning affected western larch (*Larix occidentalis*) in several parts of the Nelson Forest District, and investigation revealed that needle cast (*Hypodermella laricis*) [ibid., 18, p. 827] is generally present throughout the range of the host in British Columbia, having reached epiphytotic proportions in some areas. At seven nurseries in the Vancouver and Victoria districts *Chamaecyparis lawsoniana* was affected by root and collar rot due to *Phytophthora lateralis* [cf. ibid., 32, p. 174] and *P. cinnamomi* [ibid., 31, p. 152]. In 1952, pole blight of western white pine (*Pinus monticola*) [? *Leptographium* sp.: ibid., 32, p. 453] was reported from five areas not previously inspected, three in lower Vancouver Island and two in the interior of the Province. Stem cankering of lodgepole pine (*P. contorta* [var. *latifolia*]), associated with *Atropellis piniphila* [cf. ibid., 19, p. 629], is present throughout the range of this host in British Columbia. Of the decay in living *Populus trichocarpa* present in the middle Fraser region 92 per cent. was found to be due to *Pholiota destruens* [ibid., 31, p. 51] and *Polyporus delectans* [loc. cit.] together. *Stereum sanguinolentum*, *F. pinicola*, and *Polystictus abietinus* continued to be the principal sap rot pathogens associated with the deterioration of windthrown *Picea glauca* and *Abies lasiocarpa*.

Decay analysis conducted near Summit Lake, Prince George Forest District, revealed that white and brown rots are responsible for 85 and 13 per cent., respectively, of the decay volume in Alpine fir (*A. lasiocarpa*). In living trees the major white-rotting fungi are *S. sanguinolentum*, *E. tinctorium*, and *O. bicolor*. The chief brown cubical rots, all confined to the stumps and butt ends, are due to *Polyporus balsameus*, *Coniophora puteana*, and *Merulius himantioides*.

Marsden (D. H.). **Dutch Elm disease: an evaluation of practical control efforts.**—*Plant Dis. Reptr*, 37, 1, pp. 3–6, 1953. [Multilithed.]

This is a brief account of the efforts made from 1942 to 1952 to control Dutch elm disease (*Ceratostomella ulmi*) [*R.A.M.*, 31, p. 581; 32, p. 156] at Amherst and Easthampton, Massachusetts. A close record of disease incidence was kept and the results indicate that a good programme of sanitation and spraying with DDT is of primary importance. Sustained scouting and sanitation resulted in a reduction of 50 per cent. in the number of diseased trees. When control slackens, the disease can spread greatly in two years [see preceding abstract].

Sabet (K. A.) & Dowson (W. J.). **Studies in the bacterial die-back and canker disease of Poplar. I. The disease and its cause.**—*Ann. appl. Biol.*, 39, 4, pp. 609–616, 1 pl., 1952.

This is a full account of studies at the Botany School, Cambridge, on a poplar disease caused by *Pseudomonas syringae* f.sp. *populea* (syn. *P. rimifaciens*), some of the information having been noticed from other sources [*R.A.M.*, 32, p. 107]. The bacterium was isolated from poplar shoots in East Anglia in 1945. The cankers are of two kinds, 'closed' or atypical and 'open' or typical. The former is a small (1 to 3 cm.) knotted excrescence, the other a larger (1 to 15 cm.), elongated, perennial lesion with a raised rim and exposed wood. Both exude slime during wet weather in the spring. Many buds of one- to four-year-old shoots fail to open in the spring and cracks exuding slime form at the bases. Many young shoots die, the leaves and petioles developing small brown spots or large black necrotic areas, and the shoots small (3 mm.) grey blisters. These crack and exude slime. Cracks exuding slime may also appear at the nodes and at the bases of laterals. Affected shoots die in early summer, the leaves withering and dropping to leave grey, dry twigs on which fructifications of non-pathogenic fungi develop. *Populus eugenii* is very susceptible [ibid., 18, p. 68] and has a preponderance of open cankers; on resistant species [cf. ibid., 32, p. 458], such as *P. serotina* and *P. marilandica*, closed cankers are more common.

In inoculation experiments leaves could be infected through the stomata and wounds, but shoots only through wounds. Infection took place only in spring and early summer.

The bacterium differed from *Ps. syringae* in forming a little acid in maltose. Whereas *P. syringae* summers in the leaves and inflorescences of its host and winters in dormant buds, the poplar bacterium was perennial in branches, but rapidly died out in leaves and green shoots.

The pathological effects are as follows. The periderm is not directly invaded, but is mechanically ruptured and produces thick layers surrounding the 'open' cankers. The cortical parenchyma is severely attacked, with the formation of slime-filled cavities and blisters. The cavities are subsequently cut off by periderm. The bast fibres are not attacked, but are surrounded by heavily infected layers of cells in the intact bark. The cambium may be attacked before or after the formation of new wood, and is killed in several small adjacent spots ('closed' cankers) or over a large continuous area ('open' cankers). In the former the cambium continues to produce wood and phloem, and a callus partially heals the cleavages, which narrow but do not close. The following season, new rents appear, followed by further healing. In 'open' cankers callus forms at the edges, but never in sufficient quantity to heal the wounds. As a rule the wood is not attacked, but a few vessels of the primary and secondary xylem or near a leaf or branch trace may be invaded, and somewhat irregular annual rings are sometimes formed. A brick-red stain appears in the wood round cracks and cankers, in leaf and branch traces, and the medulla. The medullary rays are invaded and are very liable to infection near leaf or branch traces.

The disease is disseminated, most probably, by planting slightly infected setts, in which the condition develops rapidly during spring and early summer.

Kesselhuth. **Der Pappelkrebs und seine Folgen.** [Poplar canker and its consequences.]—*Forst u. Holz*, 8, 1, pp. 2–4, 2 figs., 1953.

A destructive canker of 26-year-old poplars (*Populus regenerata*) in the Weser Valley, Germany, was shown by inoculation experiments at the Institute of Forest Botany, Hann.-Münden, in 1952 to be caused by *Valsa sordida* [*R.A.M.*, 31, p. 523]. From an anatomical study of cross sections of the wood it was concluded that

infection had taken place six years earlier, i.e., when the heartwood in which the pathogen grows had already been formed. The typical yellow-red spore cirrhi were detected on several of the lesions. Thirty *P. robusta* trees planted alongside the diseased ones remained in excellent condition. It is recommended that the local cultivation of *P. regenerata* should be discontinued.

SELISKAR (C. E.). **Wetwood organism in Aspen, Poplar, is isolated.**—*Colo. Fm & Home Res.*, 2, 6, pp. 6–11, 19–20, 1952. [Abs. in *Biol. Abstr.*, 27, 2, p. 451, 1953.]

A description is given of *Corynebacterium humiferum* [?n.sp.], consistently associated with wet-wood disease [*R.A.M.*, 31, p. 38] of Lombardy poplar (*Populus nigra* var. *italica*) in Colorado. One year after being inoculated with the organism young *P. tremuloides* trees displayed wood discoloration extending for 6 to 12 in. above and below the inoculation site. The organism was re-isolated from the affected material.

FERNANDES (C. T.). **Le mal des Châtaigniers au Portugal.** [The Chestnut disease in Portugal.]—*Publ. Dir Serv. flor. aquic.*, 18, 2, pp. 111–120, 3 figs., 1951. [Received May, 1953.]

In connexion with a scheme for the reconstitution and protection of the chestnut forests of Portugal, experiments have been undertaken in the northern province of Tras-os-Montes in the prophylaxis of ink disease (*Phytophthora cambivora* and *P. cinnamomi*) [*R.A.M.*, 29, p. 234] by Urquijo Landaluze's method of decortication and treatment with copper-containing fungicides, e.g., copper carbonate, coppesan, or copper oxide [ibid., 29, p. 235]. Very successful results were obtained on trees with less than a third of the branches attacked, not one of those treated in 1945 showing symptoms of the disease in 1950. Experiments are also in progress in the development of resistant forms by means of crosses between *Castanea crenata* [ibid., 32, p. 107] and *C. sativa*.

BIRAGHI (A.). **Sul proposto raggruppamento di Endothia fluens (Sow.) S. et S. e di Endothia parasitica (Murr.) P.J. et H.W. And. in un' unica specie.** [On the proposed regrouping of *Endothia fluens* (Sow.) S. & S. and of *Endothia parasitica* (Murr.) P.J. & H.W. And. into a single species.]—*Boll. Staz. Pat. veg. Roma*, Ser. 3, 9 (*1951*), pp. 133–157, 1 fig., 9 graphs, 1953. [English summary.]

The author discusses the recent suggested regrouping of *Endothia* species [*R.A.M.*, 31, p. 407]. The cultural differences between *E. fluens* and *E. parasitica* described by Shear *et al.* (*Bull. U.S. Dep. Agric.* 380, 1917) are regarded as important as a basis for retaining the two as distinct species. Statistical treatment of ascus length, ascospore length and width, and the ratio between ascospore length and width revealed that there are no grounds for combining *E. parasitica* and *E. fluens*, or on the basis of cultural or biological characters.

The author rejects the theory that *E. parasitica* has been present in localized parts of Europe [ibid., 28, p. 428] since 1924 by demonstrating that the various reports were doubtful, unfounded, or based on insufficient evidence. The theory of the mutational origin of the fungus is therefore premature. The infected *Castanea crenata* seedlings discovered in Spain in 1947 were imported from Japan, from which country the parasite is assumed to have been introduced.

WECHSLER (H.). **Die Rot- und Weissfäule an Eichen.** [The red and white rots of Oaks.]—*Holz-Zbl.*, 79, 6, pp. 41–42, 1953.

Red and white rots, attributed by F. W. Neger in 'Die Krankheiten unserer Waldbäume' [1919] to *Polyporus sulphureus* [cf. *R.A.M.*, 32, p. 111] and *P. squamo-*

sus, respectively, are stated to be responsible for heavy damage to mature oaks in the forests of Bad Mergentheim, Württemberg, Germany. The average incidence of decay ranges from 15 to 20 per cent., and in 1951 and 1952 it reached 60 per cent. in certain age classes, the resultant financial loss in 1952 being computed at DM. 25,000. Possible methods for an early diagnosis of the rots are discussed, of which the most hopeful appears to be the use of X-rays.

MEYER [H.]. **Über die weitere Ausbreitung der nordamerikanischen Eichenerkrankung.** [On the further extension of the North American Oak disease.]—*Holz-Zbl.*, 79, 7, p. 50, 2 maps, 1953.

Erroneous reports presented to the Timber Committee of O.E.E.C. in Paris in July, 1951, as to the detection of *Chalara quercina* on oaks in south-western France and Italy led to the promulgation by the West German Government of an Order prohibiting the importation of oak seed, plants, or timber from any foreign country. In 1952, however, the provisions of the Order relating to other western European countries were repealed. Particulars are given of the progressive extension of the pathogen in the United States [*R.A.M.*, 32, p. 405 and next abstracts] and of the measures adopted for its control.

BRINKMAN (K. A.). **Oak wilt mortality in an unmanaged Iowa forest.**—*J. For.*, 50, 12, pp. 941–942, 1952.

An inventory was made in 1951 and 1952 of oak mortality due to wilt (*Chalara quercina*) [see preceding and next abstracts] in the Iowa State College Brayton Memorial Forest, Delaware County [*R.A.M.*, 32, p. 110]. The trees under study were presumed to have been infected and killed during the preceding eight years. Based on the total number of dead and living standing trees the wilt losses over that period were 11·3 per cent. of northern red oak (*Quercus borealis* var. *maxima*), 13·5 of the jack (*Q. ellipsoidalis*) and black (*Q. velutina*) oaks combined, and 0·4 of the white oak (*Q. alba*). The disease was more active in trees over 10·5 in. d.b.h. than in the smaller ones, 10 per cent. of the former having been killed and 1·5 per cent. of the latter. Similar conditions are reported in many other oak forests of eastern Iowa.

YOUNG (H. C.) & SPILKER (O.). **Oak wilt project.**—*Fm Home Res.*, 37, 279, pp. 97–98, 1 fig., 1952.

This article deals with the oak wilt [*Chalara quercina*: see preceding abstracts] situation in Ohio and its possible control through sanitation.

WIEHE (P. O.). **Life cycle of Botryosphaeria ribis on Aleurites montana.**—*Phytopathology*, 42, 10, pp. 521–526, 2 figs., 1 diag., 1952.

On the basis of experimental evidence the development of *Botryosphaeria ribis* on tung (*Aleurites montana*) in Nyasaland [*R.A.M.*, 30, p. 295] may be divided into four phases, namely, (1) a period of latent infection, when the spores are disseminated by wind and lodge on the fruit surface; (2) penetration of the pathogen into the peduncle a month or two before fruit fall, subsequent stem infection depending on the relative rates of fungal growth in the tissues and twig abscission; (3) twig blight, occurring early in the growing season, when the new vegetative shoots produced below the fruit twigs are killed either by *B. ribis* or *Botryodiplodia theobromae* [cf. ibid., 32, p. 287]; and (4) die-back of large branches towards the close of the growing season or in following years as a sequel to stem-girdling, apparently caused by *Botryosphaeria ribis* alone.

All infected twigs should be destroyed as soon as the trees burst into leaf. Spraying or dusting may be necessary in severely infected localities for protection from infection in view of the difficulties of securing the rapid destruction of all potential

sources of infection, *B. ribis* being pathogenic to many widely cultivated crops besides *A. montana*. The south-east trade winds reach their maximum intensity during September and October when sporulation and fruit development are in their early stages. It is of primary importance that fruits and probably apical buds be covered with a fungicidal coating as early in the season as possible, preferably between September and December.

Bagchee (K.). **New and noteworthy diseases of trees in India. The sap and heart-rot diseases of Eucalyptus maculata Hook., var. citriodora Bailey due to the attack of Trametes cubensis (Mont.) Sacc.**—*Indian For.*, 79, 6, pp. 341–343, 2 pl., 1953.

An account is given of the diseases of *Eucalyptus maculata* var. *citriodora* [*E. citriodora*] in the plains, on the Nilgiris, and in Mercara, India. The principal diseases are root rot due to *Ganoderma lucidum* [*R.A.M.*, 24, p. 411], which enters the tree through root injuries, and wood rot caused by *Trametes cubensis* [ibid., 32, p. 461], which gains entrance through lightning or fire scars, cankers formed by sun-scorch, and pruning wounds not properly treated with antiseptics. The latter fungus has been observed on park and avenue trees in the submontane regions in the north and on the plateau of Central India. *T. cubensis* also occurs on sal [*Shorea robusta*: ibid., 31, p. 95] and on its common associates in its natural habitat and destroys constructional sal timber. It produces a brown, carbonizing rot of heart- and sapwood.

Stambaugh (W. J.). **A study of the needle cast diseases of conifers in Pennsylvania.** —*J. For.*, 50, 12, p. 944, 1952.

This is a brief review of the needle cast diseases of conifers in Pennsylvania. Of the four common ones, *Bifusella linearis* [*R.A.M.*, 20, p. 614] and *Hypoderma desmazierii* [loc. cit.] are mildly parasitic on white pine, causing negligible damage, while *Lophodermium pinastri* [ibid., 31, p. 401] is the most widespread, particularly on the common Christmas tree pines, and *Hypoderma lethale* [ibid., 30, p. 639] is the most virulent. The last-named attacks only native, hard pines, causing heavy infection to some 10 to 30 per cent. of the total stand in the areas studied. Other serious diseases are *Rhabdocline* [*pseudotsugae*], not previously reported in Pennsylvania [C.M.I. map No. 52], responsible for heavy infection in 40 per cent. of the total Douglas fir [*Pseudotsuga taxifolia*: *R.A.M.*, 25, p. 19 ; cf. 32, p. 458] stand, and white pine blight [? *Leptographium* sp.: see above, p. 521], which causes more damage than the needle cast diseases, a survey of several plantations having shown that on a per acre basis 50 pines were in an advanced blight condition, 304 intermediately chlorotic, and 186 healthy.

Bingham (R. T.), Squillace (A. E.), & Duffield (J. W.). **Breeding blister-rust-resistant Western White Pine.**—*J. For.*, 51, 3, pp. 163–168, 6 figs., 1953.

The programme adopted by the Inland Empire project, United States, for breeding western white pines (*Pinus monticola*) resistant to blister rust (*Cronartium ribicola*) [cf. *R.A.M.*, 32, p. 464 and next abstract] is outlined. Major attention is to be devoted to intraspecific crossing. So far grafting on the 70 resistant trees (17 to 66 years old and 6 to 90 ft. high) selected from heavily infected areas has been very successful and is to be used for the propagation of these trees.

Straib (W.). **Zur Frage der Rassenbildung bei Cronartium ribicola Dietr.** [On the question of race formation in *Cronartium ribicola* Dietr.]—*Zbl. Bakt.*, Abt. 2, 107, 5–7, pp. 98–112, 12 figs., 1953.

At the Brunswick branch of the Biological Institute the aecidiospore germ-tubes

of three collections of blister rust (*Cronartium ribicola*) from neighbouring white pine (*Pinus strobus*) [*R.A.M.*, 22, p. 53] stands showed differences at temperatures between 18° and 22° C. in the extent of branching, as well as in torsion, curling, and loop formation, which are considered to point to the existence of physiologic races within the species. Similar but slighter differences were observed in the uredospore germ-tubes. The minimum, optimum, and maximum temperatures for the germination of all three collections were 5° to 6°, 18°, and 25° to 26°, respectively.

The author observed the appearance of the uredo and teleuto states on black currant four to six weeks earlier (beginning of July) in south Germany than in the Brunswick district. In the former region, therefore, the susceptible young white pine shoots are immediately accessible to infection, whereas in the latter they will have acquired a measure of resistance by the time the rust reaches a comparable stage. In breeding for resistance to *C. ribicola* [see preceding abstract], selections should be tested simultaneously in various localities, where they are exposed to infection by different physiologic races under diverse environmental conditions.

MANDEL (G.). **Vorbeugungsmassnahmen gegen Kiefernschütte.** [Precautionary measures against Pine needle cast.]—*Holz-Zbl.*, 79, 6, pp. 42–43, 1953.

From practical experience in Saxony, Germany, the author has found that needle cast of pines (*Lophodermium pinastri*) [*R.A.M.*, 30, p. 439; cf. 32, p. 350] can be effectively combated by silvicultural measures designed to promote the vigorous growth of seedlings, including liberal applications of fertilizers and sparse sowing, i.e., at a maximum rate of 300 gm. seed per are [119 sq. yds.] of seed-bed.

HENNIG (R.). **Ermittlung von Holzfäulen an stehenden und liegenden Stämmen.** [Determination of wood rots in standing and felled trunks.]—*Holz-Zbl.*, 79, 7, p. 49, 1 fig., 1953.

The construction and application of the Pressler increment borer for the determination of rots in conifers and very soft hardwoods are described. The implement is designed to penetrate to a depth of 6 to 40 cm. Advanced decay is immediately revealed by the condition of the borings, and even in an incipient stage it is generally recognizable by a distinct discoloration, often accompanied by a characteristic odour. Specific identification may be effected by culturing from the rotted material.

LOWE (J. L.). **Southern and tropical polypores.**—*Pap. Mich. Acad. Sci.*, 37 (*1951*), Part I, pp. 49–53, 1952. [Received April, 1953.]

Notes are given on the additional taxonomy or further distribution of seven species of Polyporaceae collected in south-eastern United States [see next abstract] during the summers of 1949 and 1950, including two new to the States. *Polyporus subcartilagineus* [*R.A.M.*, 23, p. 124], associated with a brown cubical [wood] rot, was hitherto reported only from Quebec and Pennsylvania but is fairly common in the Adirondack Mountains, New York, the high-mountain country of western North Carolina, and the Great Smoky Mountains of eastern Tennessee. *P. floriformis* was collected on *Liriodendron*.

BAXTER (D. V.). **Some resupinate polypores from the region of the Great Lakes. XXIII.**—*Pap. Mich. Acad. Sci.*, 37 (*1951*), Part I, pp. 93–110, 18 pl., 1952. [Received April, 1953.]

The present paper in this series [cf. *R.A.M.*, 31, p. 637] comprises a discussion of several North American and European polypores [see preceding abstract], including species of *Fomes*, *Fomitoporia*, and *Poria*, with special reference to their occurrence, distinctive morphology, and cultural characters.

Poria laevigata f. *prunicola* n.comb. attacking mostly *Prunus* spp., on which it produces a red, mottled rot, has been described under the name *Poria prunicola* [ibid., 12, p. 543]. *Fomes robusta* f. *abietis* n.f. is confined to *Abies* spp. and may be distinguished from all other fungi in this group by the unusual temperature relations, viz., it grows 1, 15, and 0 mm. in two weeks at 25°, 30°, and 35° C., respectively. *F. robustus* f. *juniperinus* n.comb. (*Fuscoporia juniperina*) [ibid., 28, p. 498] is confined to *Juniperus* spp. although it agrees morphologically with *Fomes robustus* f. *taxodii* [loc. cit.]. Since f. *taxodii* occurs so much more commonly than f. *juniperinus*, however, it appears that possibly two forms or races may exist.

Lindgren (R. M.) & Harvey (G. M.). **Decay control and increased permeability in Southern Pine sprayed with fluoride solutions.**—*J. For. Prod. Res. Soc.*, 2, 5, pp. 250–256, 3 figs., 1952. [Abs. in *Bull. Inst. Pap. Chem.*, 23, 7, p. 514, 1953.]

Surface applications of 3 to 5 per cent. solutions of ammonium bifluoride and sodium fluoride substantially reduced losses from [unspecified] decay and increased permeability in peeled and rough southern pine [*Pinus taeda* and *P. caribaea*] pulpwood [in Louisiana: *R.A.M.*, 32, p. 52]. The treatments were considerably more effective than the highly fungicidal chlorinated phenol and organic mercury solutions, used separately or in combination, particularly under conditions of slow seasoning of the wood over long periods and when spraying was delayed for up to a week after bolt cutting. *Trichoderma* [*viride*] flourished on fluoride-treated wood and apparently helped to control the decay fungi by a breakdown of ray cells.

Scott (M. H.). **Timber investigations in the Union of South Africa.**—African Regional Scientific Conference, Johannesburg, October 17 to October 28, 1949. II. Statements and Communications, pp. 183–186, 1949–50. [French summary. Received 1953.]

The author briefly describes the functions of the Forest Products Institute, Pretoria West, established in 1928. It is the only laboratory of its kind on the African continent. Attention is drawn, *inter alia*, to the research it has undertaken on problems of timber preservation.

Rennerfelt (E.). **Massaindustrins virkesvårds-problem.** [The wood storage problem of the pulp industry.]—*Svensk PappTidn.*, 55, 16½ (Kongressnummer), pp. 609–612, 2 figs., 1 diag., 3 graphs, 1952.

This account of the losses in stored pulp in Swedish woodyards caused by fungi, including *Stereum sanguinolentum*, *Lentinus lepideus*, *Lenzites sepiaria*, and *Trametes serialis*, with recommendations for their control, is based largely on Björkman's investigations on the same subject [*R.A.M.*, 26, p. 88].

Meteer (J. W.) & Sarles (R. L.). **Cold soaking helps utilize non-durable woods to make good fence posts.**—*Fm Home Res.*, 37, 276, pp. 39–40, 42–43, 1952.

Tests using the cold-soak process were carried out at the Experiment Station, Wooster, Ohio, to produce from non-durable tree species treated posts which will provide a fence line life of 15 or more years. Timber treatments [*R.A.M.*, 32, p. 462] are described and the results given.

Lohwag (K.). **Zur Fruchtkörperbildung holzzerstörender höherer Pilze in Reinkultur.** [On the production of fruit bodies of wood-destroying higher fungi in pure culture.]—*Sydowia*, Ser. II, 6, 5–6, pp. 323–335, 2 pl., 1952. [English summary.]

On the basis of experiments at the Institute for Soil Culture, Vienna, and from the literature, the author has compiled a list of over 150 species of lignicolous fungi which produced sporophores in pure culture.

Chester (K. S.) & McLaughlin (J. H.). **Recognition and control of vegetable diseases.**—*Ext. Serv. Circ. Okla. A. & M. Coll.* 475, 15 pp., [1952].

Recommendations for the control and means of recognition of certain vegetable diseases in Oklahoma are given.

Van Hoof (H. A.). **Stip in Kool, een virusziekte.** [Speck in Cabbage, a virus disease.]—*Meded. Dir. Tuinb.*, 15, 8, pp. 727–742, 6 figs., 2 graphs, 1952. [English summary.]

Late-maturing and more especially stored white, Savoy, and red cabbage in North Holland sustain serious damage from cauliflower mosaic virus [cf. *R.A.M.*, 31, p. 2; 32, p. 463], the agent of a necrosis known as 'speck'. The principal source of inoculum is seed cabbage and the most important vector of the disease is probably *Brevicoryne brassicae* [cf. ibid., 28, p. 262]. The seedlings are transplanted in June, and from the trend of the aphid population transmission appears to take place during July, support being lent to this hypothesis by the correlation between severe 'speck' seasons and dry weather in July. Control by prohibition of seed cabbage cultivation being impracticable, seed crops should be sprayed to eradicate the vector, infected plants rogued, the sprouting of stumps left in the field prevented, the less susceptible strains grown, and seed-beds located at a distance from seed cabbage.

Takahashi (W. N.). **Rod-shaped virus of Radish mosaic.**—*Phytopathology*, 42, 11, pp. 623–624, 1 fig., 1 graph, 1952.

At the Division of Plant Pathology, University of California, Berkeley, rod-shaped particles, 105 to 120 by 25 mμ, were constantly present in extracts of White Icicle radish, Tendergreen mustard (*Brassica juncea*), and Shogoin turnip infected by radish mosaic virus [*R.A.M.*, 31, p. 97]. They were absent from extracts of healthy control plants. Both healthy and diseased plants contained numerous spherical particles.

Schlösser (L.-A.). **Zur Frage der Wanderung europäischer Rübenvirosen.** [On the question of the migration of European Beet viroses.]—*Phytopath. Z.*, 20, 1, pp. 75–82, 1952.

During the past two decades beet yellows virus [*R.A.M.*, 32, p. 227 has spread from England and northern France to a number of countries, including [besides those recorded in C.M.I. map No. 263] Austria [*R.A.M.*, 32, p. 55], Yugoslavia [ibid., 31, p. 363], Italy (1951), Turkey, Persia (both 1952), and Syria (one case of mild infection).

Seeking for the original focus of the disease in England, the author detected in two south-eastern localities a large number of apparently healthy *Beta maritima* plants, which on closer examination revealed symptoms, especially on the ageing lower leaves, of intensive mixed yellows and mosaic virus infection. Besides these vigorously growing plants, which evidently carried genes conferring tolerance or resistance, were others with obvious mixed virus symptoms resembling those observed on elite sugar beet seed-bearers. A batch of 200 'tolerant' *B. maritima* plants from the north bank of the Thames estuary was sent to Einbeck, Germany, for biological analysis, which disclosed every known form of the yellows and mosaic virus groups, as well as others hitherto undetected in any of the infested regions.

It is postulated that the various types of virus harboured in the English wild beets were probably transmitted by aphids to neighbouring cultivated crops. Once or more in the course of every summer mass multiplication of the aphids coincides with favourable westerly winds, which convey the vectors to sugar beet in adjacent parts of Europe where the range of the viroses is extending year by year.